Railway Engineering Maintenance

rolong Tie Life

The prevailing tie scarcity makes it a necessity to prolong the life of ties now in track. The IMPROVED FAIR ANCHOR with its large bearing area prolongs TIE LIFE.

Reliance **HY-CROME** *Spring Washers*

HY-CROME SPRING WASHERS —A SPECIFIC KIND AND TYPE FOR ALL BOLT APPLICATIONS

Only helical coil spring washers automatically and adequately compensate for looseness as a result of wear and bolt stretch. They maintain permanent tension in the assembly to keep it tight. HY-CROME Spring Washers have been scientifically developed to more completely measure up to these requirements.

Eaton Manufacturing Company

RELIANCE SPRING WASHER DIVISION

MASSILLON, OHIO

New York • Cleveland • Detroit • Chicago • St. Louis • San Francisco • Montreal

Published monthly by Simmons-Boardman Publishing Corporation, 105 W. Adams St., Chicago 3, Ill. Subscription price: United States and Possessions, and Canada, $2.00; Foreign, $3.00. Single copies 35 cents. Entered as second-class matter January 20, 1933, at the postoffice at Chicago, Ill., under the act of March 3, 1879, with additional entry at Mount Morris, Ill., postoffice. Address communications to 105 W. Adams st., Chicago, Ill.

BRIDGES GET THE *once-over treatment* FOR RUST

. . . And "once over" is enough when you use NO-OX-ID. It penetrates to the base metal, loosening the old rust scale. As patches fall off, the spots are touched up. From one to three years later, a finishing coat of NO-OX-ID Filler can be applied with a minimum of labor to give continuous protection.

No expensive pre-cleaning is necessary with NO-OX-ID . . . in fact, railroads using NO-OX-ID report savings up to 50% on bridge maintenance.

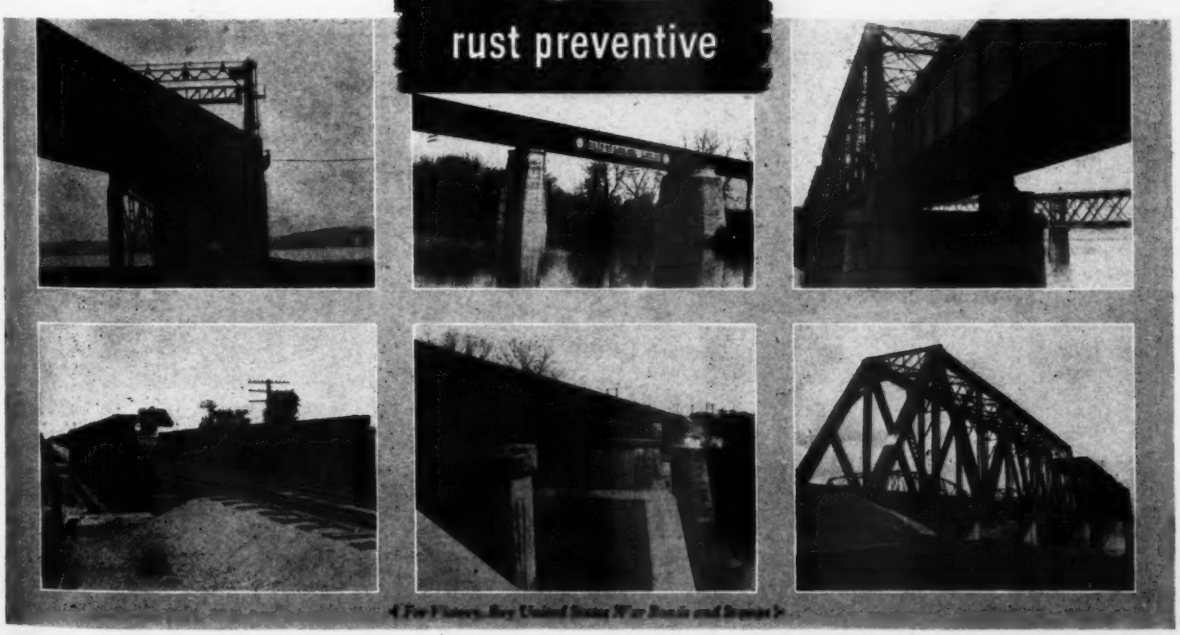
Under present conditions, with fewer men to do the work, the protection afforded by one application plus the speed with which it can be done is most important. Write for data book . . . it explains the very simple method of application. Dearborn Chemical Company, Dept. U, 310 S. Michigan Avenue, Chicago, Illinois. NEW YORK • LOS ANGELES • TORONTO

"THE LEADER FOR 25 YEARS"

NO-OX-ID

IRON RUST

rust preventive



VERONA

FIXED TENSION TRIFLEX SPRINGS

Eliminate Buckling and Pulling Apart of Track

The Verona Fixed Tension Triflex Spring is a calibrated leaf spring for track bolts. Its high reaction (over 250% of A. R. E. A. specifications) compensates for any looseness developed from wear while retaining at all times equal bolt tension throughout the joint.

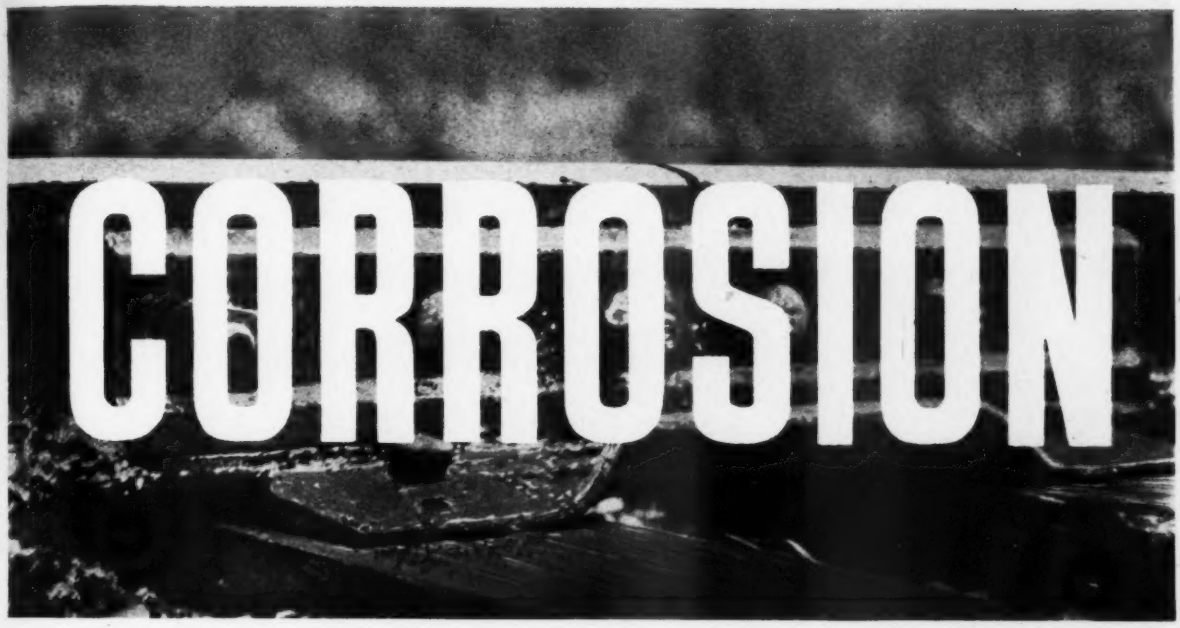
Write Today for complete information

SINCE 1873

WOODINGS-VERONA TOOL WORKS, VERONA, PA.

SINCE 1873

Look Out for

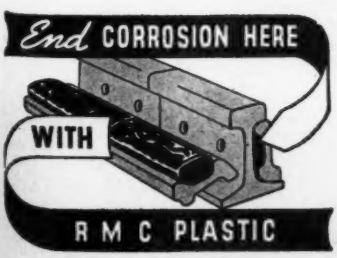


RMC PLASTIC is easily applied on the inner faces of the joint bars. When they are bolted to the rails (with the handy RMC Tool), the bolting action solidly packs the Plastic into every section of the joint assembly.

It's no news to you that corrosion can play havoc with your rail joints. A few years ago there wasn't much you could do about it. Then came RMC PLASTIC—now thoroughly time-proved and field tested—providing a certain, permanent protection against corrosion in the joint area.

With rail joints taking an unprecedented battering from the heaviest traffic in history, the extra factor of safety and protection which RMC PLASTIC affords against corrosion is more needed than ever before.

Rail joints, with proper bolt tension, that are thoroughly lubricated with RMC PLASTIC, do not "freeze" but can expand and contract properly, so that rail-end batter is reduced and kinks and humps in track are avoided. One simple application will prevent rail joint corrosion permanently.



ACT TODAY to safeguard your rail joints with RMC PLASTIC
You Can get ALL you need—WHEN You Need it!

RAILWAY MAINTENANCE CORP.
PITTSBURGH **PENNSYLVANIA**

RELIEVE YOUR MAN-POWER SHORTAGE WITH FLEX-TOE CLAW BARS

MADE BY THE MANUFACTURERS OF THE FAMOUS DEVIL LINE OF TRACK TOOLS . . . . .

If your track gangs are short-handed, you need Flex-Toe Claw Bars. Two men, each using a Flex-Toe, can do the work of three men with ordinary bars. A broad statement? Well, let's look at the facts and then judge for yourself.

1. One man alone, without a helper and *without dangerous spike maul driving*, can pull any spike (headed or headless, brine-eaten or throat-cut) as well as drift bolts or boat spikes. The tough, sharp, alloy steel toes automatically grab and hold—the more pressure applied to the handle, the tighter they grip the spike.
2. Shimming under the heel is unnecessary. A series of bites at different positions along the shank of the spike lifts it out.
3. Green, inexperienced men learn to use it instantly. No "tricks of the trade" to learn—just throw it onto the spike in the usual way, apply leverage, and lift it out.
4. Spike maul driving is eliminated. Thus Flex-Toe saves time and is safer to use, thereby improving your safety record. Hence, spike-pulling with Flex-Toe is a one-man, one-tool job.
5. The toes are made of alloy steel to give longer life, but when it is necessary to replace worn toes which need repair, new ones are easily inserted.
6. Spikes in close spaces, such as at guard rails, in rail joints, frogs, etc., come out in a jiffy. No extra operations are required—no shimming or blocking under the heel.
7. Due to the design of the toes, they do not get caught under the rail.
8. Flex-Toe saves ties by removing *all* spikes.

These time-saving and safety factors added together mean that each man in your short-handed gangs will pull 50% more spikes with fewer accidents, and the work will be easier for older and younger men. It will pay you to write for prices and descriptive literature.

WARREN HEAVY HAND TOOLS

WARREN TOOL CORP. • WARREN, OHIO

IN USE ON 91 RAILROADS

and

7 YEARS SATISFACTORY SERVICE

BARCO *Tytampers*

Improve Maintenance of Way!

1943 railroad traffic is expected to exceed by 10% the peak traffic of 1942, making it essential to prolong the rail life by spot tamping joints and otherwise keeping the ballast in suitable condition.

BARCO UNIT TYTAMPERS may be used with large gangs in relaying rail or out-of-face tamping and may be split up into small units of two or four for spot tamping by the various section gangs.

BARCO MANUFACTURING COMPANY

1805 W. Winnemac Ave. — NOT INCORPORATED — Chicago, Illinois

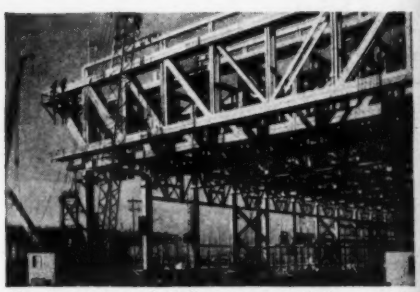
In Canada THE HOLDEN COMPANY, LTD.

Montreal — Moncton — Toronto — Winnipeg — Vancouver

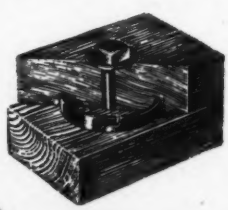
FREEDOM IS NOT FREE—IT IS PRICELESS ★ *BUY WAR BONDS*

Up from the log pond into the sawmill. Wood is contributing to victory on every fighting front. At home, lumber prefabricated under the TECO Connector System of timber engineering has replaced metal in thousands of heavy war structures such as the aircraft assembly plant shown above. Engineered timber is destined to play a leading role in the reconstruction era to come. You, also, can design in timber with TECO—for strength, durability, and economy. Write today for our literature.

27,000,000 Feet of Lumber



Giant, engineered timber trusses of the world's largest timber-built factory, designed by The Austin Company, of Chicago, engineers and builders.



The ***TECO*** Ring Connector spreads the load on a timber joint over practically the entire cross-section of the woods . . . brings the full structural strength of lumber into play.

TIMBER ENGINEERING COMPANY

NATIONAL MANUFACTURERS OF ***TECO*** *TIMBER CONNECTORS AND TOOLS*

WASHINGTON, D. C. **PORTLAND, OREGON**

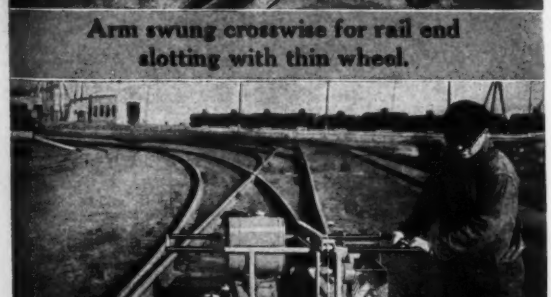
WOOD GOES TO WAR — An MGM Technicolor short by James A. Fitzpatrick. Ask your theater when you can see it

This FLEXIBLE ARM GRINDER

is the answer to your track grinding problems

Arm easily reaches every place on track where grinding is done

Removing flow at switchpoint with double faced cupwheel.



Arm swung crosswise for rail end slotting with thin wheel.

Arm tilted so that cupwheel can undercut stock rail to house switchpoint.

For SPEED and CONVENIENCE, no grinder used for track maintenance can approach the performance of this Flexible Arm Grinder, a recent development of Nordberg. This unusual grinder is the result of many years experience in designing machines to do track work better, faster and at less expense. Here are some of the jobs it will do:

- Remove flow at switchpoints and stock rails.
- Undercut stock rails to house switchpoints.
- Grind frogs and flangeways.
- Groove rail at turnouts.
- Slot rail ends.

Write for Bulletin 107 describing the Flexible Arm Grinder.

NORDBERG MACHINERY

NORDBERG MFG. CO. MILWAUKEE WISCONSIN

Export Representative—WONHAM Inc.—44 Whitehall St., New York

...when they're built of "CZC"-treated lumber

DECAY is the cause of more than 80% of the failures of wooden parts in wood or composite type cars.

A study of 399 cars passing through a typical repair shop showed the following causes of failure:

ITEM	% of cases in which failure was due to decay
End sills	34.4%
Deadwood	7.4%
Longitudinal sills	68.0%
Sub-sills—nailing sills	26.2%
End posts	32.4%
Coal car sides	80.1%
Running boards	97.3%
Siding	89.5%
Lining	89.1%
Decking	95.4%
Grain strips	96.5%
Roofing	100.0%

Here is how authorities estimate the life of the various parts of untreated wooden cars:

Stock car side posts	4 to 6 years
Stock car end posts	6 to 8 years
Stock car decking	2 to 5 years
Stock car sills	5 to 8 years
Stock car roofing	4 to 6 years
Flat car decking	6 to 8 years
Flat car sills	8 to 10 years
Box car sills	6 to 10 years
Refrigerator sills	4 to 5 years

"CZC"-treated wood resists decay—greatly extends the useful life of car timber. "CZC" gives wood greater nail-holding power to stand up under heavy vibration. And it gives wood measurable resistance to fire.

"CZC"-treated wood has no objectionable odor to contaminate freight in transit. It will take paint just as well as untreated wood.

For all construction subject to severe service conditions, insist on "CZC"-treated wood. There is ample treating and preservative capacity to meet both military and essential transportation needs.

E. I. du Pont de Nemours & Co. (Inc.), Grasselli Chemicals Department, Wilmington, Delaware.

DU PONT

REG. U.S. PAT. OFF.

CZC

CHROMATED ZINC CHLORIDE

WOOD PRESERVATIVE

BETTER THINGS for BETTER LIVING . . . THROUGH CHEMISTRY

TIME

IS THE CRITICAL ELEMENT OF TODAY

THE demand is imperative . . . minutes and hours must be held to strict accountability for accomplishment . . . manpower and energy must be conserved.

Rail executives recognize that sureness and swiftness of operation depend importantly upon efficient patrol for inspection and emergency correction . . . upon vigilant men and dependable equipment for basic maintenance. Fairmont motor cars have an established place in this vital branch . . . a position of leadership won by specialized study of railroad needs and problems through a third of a century.

And the practical value of this long experience is reflected in the universal preference for cars and accessories that have demonstrated their dependability and economy in Performance On The Job. Fairmont Railway Motors, Inc., Fairmont, Minnesota.

M9 Series D — One- to Two-Man Inspection Car. Surplus powered for tough going. Light weight for easy handling. Rear lift only 95 lbs.

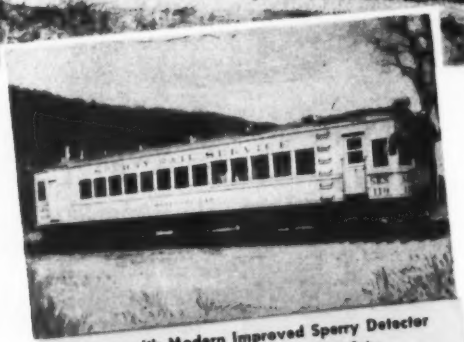
Fairmont

RAILWAY MOTOR CARS

OF ALL THE CARS IN SERVICE TODAY MORE THAN HALF ARE FAIRMONTS

Performance ON THE JOB COUNTS

Transcontinental freight highballs over the "Racecourse Division" (Central Kansas-Colorado) at speeds up to 70 m.p.h. Missouri Pacific employs constant and continuous Sperry testing.



Testing with Modern Improved Sperry Detector Cars assures maximum rail safety.

Transverse fissures are growing in rails continuously.

..HOW OFTEN SHOULD TRACK BE TESTED?

More than 55,000 fissured, and 58,000 otherwise defective rails, have been located by the Sperry Fleet of 16 Modern Improved Detector Cars, and removed from track since "Pearl Harbor."

During 1942, Detector Cars of the Sperry Fleet located one defective rail in every 1.6 miles of more than 140,000 miles of track tested.

Experience has shown that in addition to gross ton miles the number of rolling wheels and the speed of traffic are two of the fundamental causes of the rapid growth of internal transverse fissures.

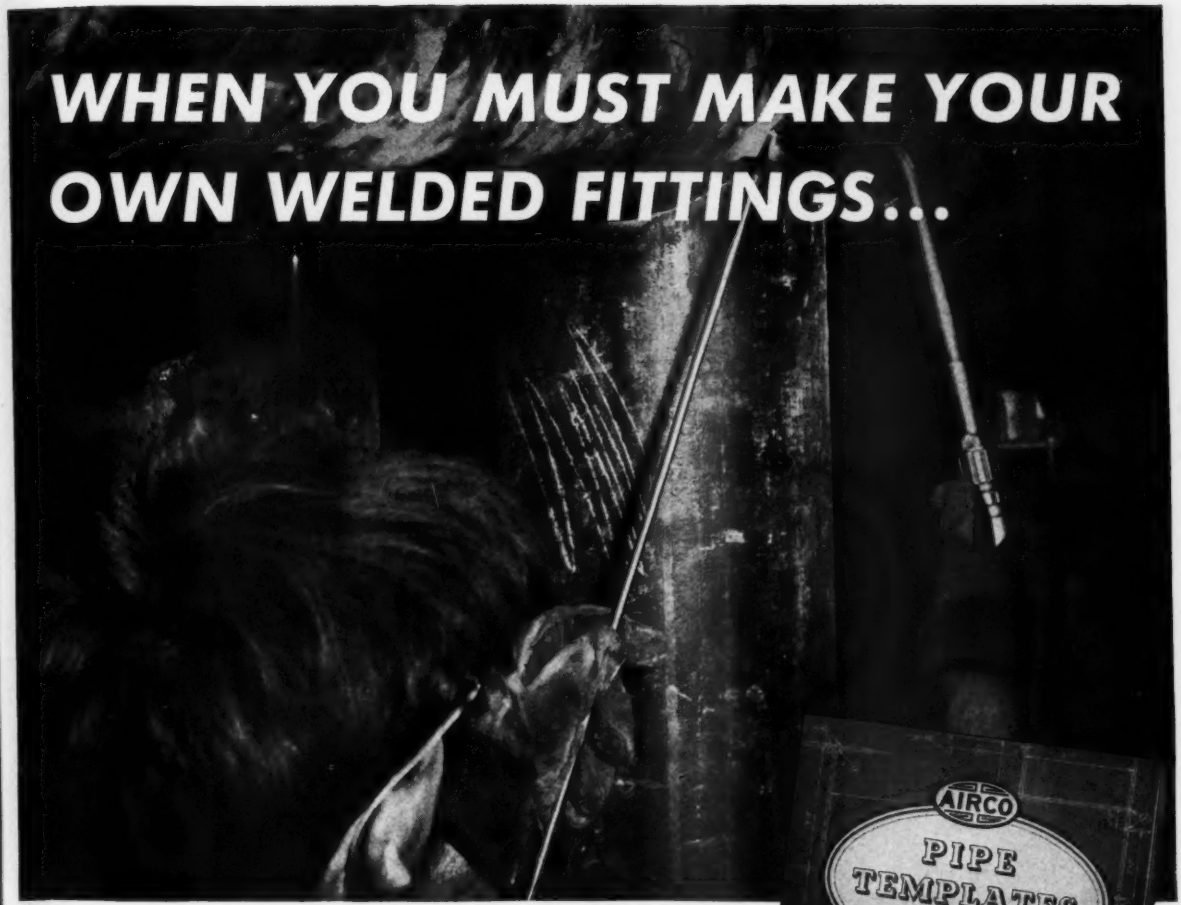
Many Class I railways are testing their tracks twice a year and others are testing even more frequently.

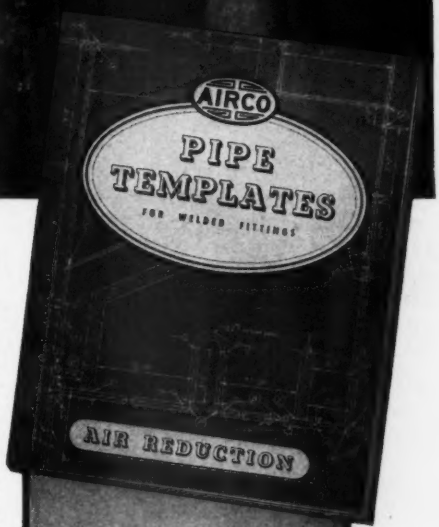
In these crucial days when so much depends on rail transportation, adequate track testing is one of the most important considerations of railway officers.

SPERRY RAIL SERVICE

HOBOKEN, N. J. CHICAGO, Ill.

WHEN YOU MUST MAKE YOUR OWN WELDED FITTINGS...





...this NEW Booklet shows you how

When time is short . . . standard welding fittings are not immediately available...and you must make your own—Airco's new booklet "Pipe Templates for Welded Fittings" shows you how. This 12 page illustrated booklet describes how to develop and use templates for fabricating many commonly used welded pipe fittings. A sequence of photographs clearly illustrates the correct flame cutting and welding procedure to be followed.

With the help of this booklet, even relatively inexperienced workers can make accurate pipe connections that are tight fitting and leak proof. Moreover, by eliminating guess-work in fitting up pipe, this booklet saves you valuable time and labor and helps conserve vital materials.

We will be glad to send you as many free copies of this booklet as you desire. Please fill out and mail the attached coupon and indicate the number of copies you require.

MAIL COUPON FOR FREE COPY

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Please send me_____copies of the free booklet "Pipe Templates for Welded Fittings."

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IDLE CYLINDERS ARE PRODUCTION SLACKERS: KEEP 'EM ROLLING FOR VICTORY!

LAST YEAR'S BONDS GOT US STARTED

THIS YEAR'S BONDS

ARE TO WIN!

★ Last year saw nearly 30,000,000 workers voluntarily buying War Bonds through some 175,000 Pay-Roll Savings Plans. And buying these War Bonds at an average rate of practically 10% of their gross pay!

This year we've got to top *all* these figures—and top them handsomely! For the swiftly accelerated purchase of War Bonds is one of the greatest services we can render to our country . . . and to our own sons . . . and our neighbors' sons. Through the mounting purchase of War Bonds we forge a more potent weapon of victory, and build stronger bulwarks for the preservation of the American way of life.

"But there's a Pay-Roll Savings Plan already running in my plant."

Sure, there is—but how long is it since *you've* done anything about it? These plans won't run without winding, any more than your watch! Check up on it today. If it doesn't show substantially more than 10% of your plant's pay-roll going into War Bonds, it needs winding!

And you're the man to wind it! Organize a vigorous drive. In just 6 days, a large airplane manufacturer increased his plant's showing from 35% of employees and 2½% of pay-roll, to 98% of employees and 12% of pay-roll. A large West Coast shipyard keeps participation jacked up to 14% of pay-roll! You can do as well, or better.

By so doing, you help your nation, you help your workers, and you also help yourself. In plant after plant, the successful working out of a Pay-Roll Savings Plan has given labor and management a common interest and a common goal. Company spirit soars. Minor misunderstandings and disputes head downward, and production swings up.

War Bonds will help us win the war, and help close the inflationary gap. And they won't stop working when victory comes! On the contrary—they will furnish a reservoir of purchasing power to help American business re-establish itself in the markets of peace. *Remember, the bond charts of today are the sales curves of tomorrow!*

You've done your bit Now do your best!

THIS SPACE IS A CONTRIBUTION TO AMERICA'S ALL-OUT WAR EFFORT BY
RAILWAY ENGINEERING AND MAINTENANCE

KEEP 'EM ROLLING

WITHOUT INTERFERING WITH SCHEDULES

POINTING THE POST WAY
to Faster, Uninterrupted Schedules!

Each Link-Belt Speeder incorporates dependable stability, greater power, greater flexibility, finger-tip control and rapid booming. These machines are performing vital services for the railroads in maintaining right of way, bank widening, ditching, filling, bridge work and similar jobs. They go about their business without interfering with routine operations of the road—providing tomorrow's modern, efficient performance, today!

9218

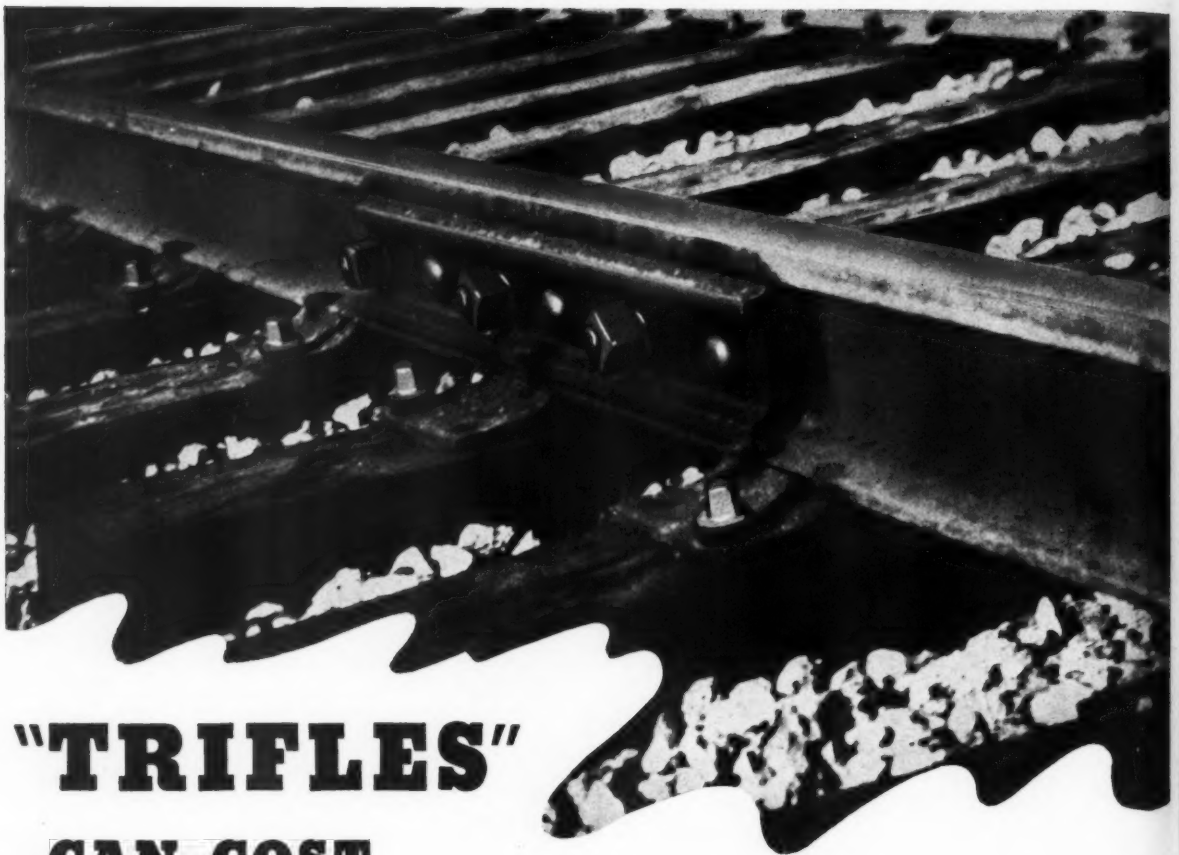
BUY WAR BONDS AND STAMPS

Off-Track Equipment

LINK-BELT SPEEDER

BUILDERS OF THE MOST COMPLETE LINE OF
SHOVELS—CRANES—DRAGLINES

LINK-BELT SPEEDER CORPORATION, 301 W. PERSHING ROAD, CHICAGO, ILL.
(A DIVISION OF LINK-BELT COMPANY)



"TRIFLES" CAN COST MILLIONS!

What is a trifle? A few thousandths of an inch of metal isn't much —but in the wrong place it is no trifle, for it *can* be troublesome and costly!

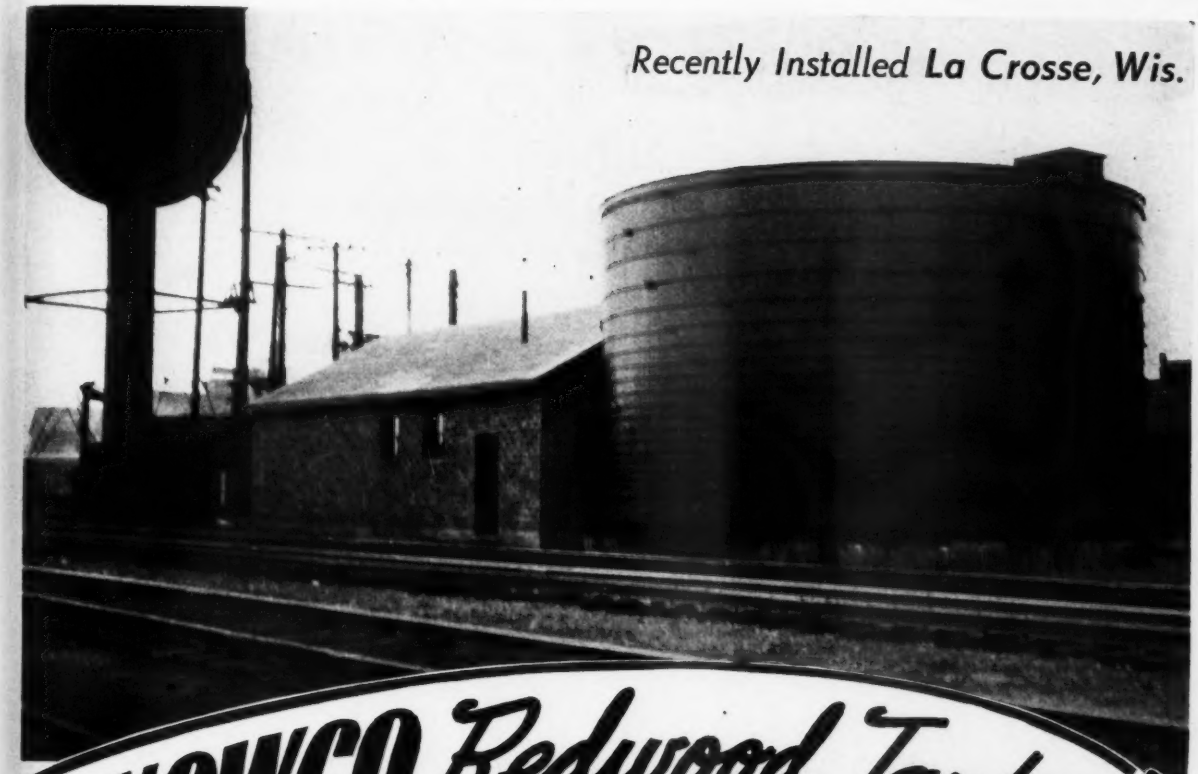
For example, an oversize thread on track bolts makes threading-on of the nut more difficult; bolt shanks slightly oval instead of round, can't be inserted easily. Extra seconds consumed by such "trifles," multiplied over and over in a few miles of track, will prove costly in manpower, lost time, increased expense.

Your protection against these losses is accurately made track accessories. Being specialists in the manufacture of such items, Oliver knows how to produce accurately-made bolts, nuts and rivets in large quantities.

For your own protection, investigate the "trifles" that make for perfection in fasteners.

OLIVER
IRON AND STEEL
Corporation

SOUTH TENTH AND MURIEL STREETS · PITTSBURGH, PENNSYLVANIA



Recently Installed **La Crosse, Wis.**

SNOWCO Redwood Tanks!

NOW AVAILABLE

In Capacities Up To

150,000 Gallons

ALSO
SPECIAL
Types
for
BOILER WATER
TREATING TANKS

T. W. SNOW
CONSTRUCTION CO.

9 So. Clinton Street
Chicago

No. 175 of a Series

Railway
Engineering and Maintenance
SIMMONS-BOARDMAN PUBLISHING CORPORATION

105 WEST ADAMS ST.
CHICAGO, ILL.

Subject: If You Had No Maintenance Magazine

July 1, 1943

Dear Reader:

When in Mexico during the last month studying the railways of that country, I was impressed with the complete lack of familiarity of the maintenance officers on those railways with many of the practices that have been followed so long on our railways that they are no longer the subject of discussion. In talking with the officers of these railways about their lack of knowledge of the experiences of their fellow railway men north of the Rio Grande, I was struck with the explanation given me by one discerning officer.

"You have no idea," he said, "how alone we are. We have, to all practical purposes, only one railway down here—we, therefore, lack the spur of competition that does so much to improve your practices. We have no associations such as your American Railway Engineering Association and your Roadmasters' Association, with their meetings, where our men can gather to talk over their problems and exchange experiences. Even more important, we have no magazine such as Railway Engineering and Maintenance to bring to our attention the developments and discoveries of others currently from month to month. Of course, some of our men read your publications but few of them are able to gather the help that is contained therein, because of the barrier of language. In brief, we are very much alone."

This comment set me to thinking. How much of our progress do we owe to the associations that have become so much a part of our railway life, and to the opportunity that they afford for exchanging information and learning from others of similar interests? Of even more direct concern, how much are our practices promoted by the exchange of information provided from month to month in the columns of Railway Engineering and Maintenance? More specifically, how many of the practices or modifications in practices that you have put into effect during the last year, first came to your attention through information published in our editorial and advertising pages?

Sometimes we fail to appreciate adequately a service that has come to be accepted as matter of fact, until some condition arises that deprives us of that service. The comment of my Mexican friend gave me a new measure of the value of the contribution that we of the staff of Railway Engineering and Maintenance are making to the stimulation of greater efficiency in your maintenance practices. Does it set up a similar line of thought in your mind?

Yours sincerely,

Elmer T. Howson

ETH:GP

Editor

MEMBERS: AUDIT BUREAU OF CIRCULATIONS AND ASSOCIATED BUSINESS PAPERS, INC.

OXY-ACETYLENE PRESSURE-WELDED RAIL . . . *Eliminates Batter and Joint Maintenance*

WHEN Oxweld's pressure-welding method is used to join rails, a continuously smooth surface is provided. Rail end batter and maintenance of joints and signal bonds are consequently eliminated.

Pressure-welded rails are particularly valuable in tunnels, for example, since the rail surfaces are free of depressions or pockets where moisture might lodge or where destructive chemicals from coal smoke might accumulate and cause corrosion through bolt-holes and on the surfaces back of angle bars.

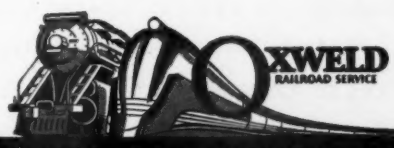
On bridges pressure-welded rail reduces impact, and in station platforms, where maintenance is difficult, it has proved its worth. Once the rails are laid—and covered, (if desired)—joint maintenance can be forgotten. In road crossings, on overhead structures, and in open track pressure-welded rail is equally economical and efficient.

Your Oxweld representative will be glad to give you the latest information on how pressure-welded rail can be used to advantage to make the most of available rail.

THE OXWELD RAILROAD SERVICE COMPANY
Unit of Union Carbide and Carbon Corporation

UCC

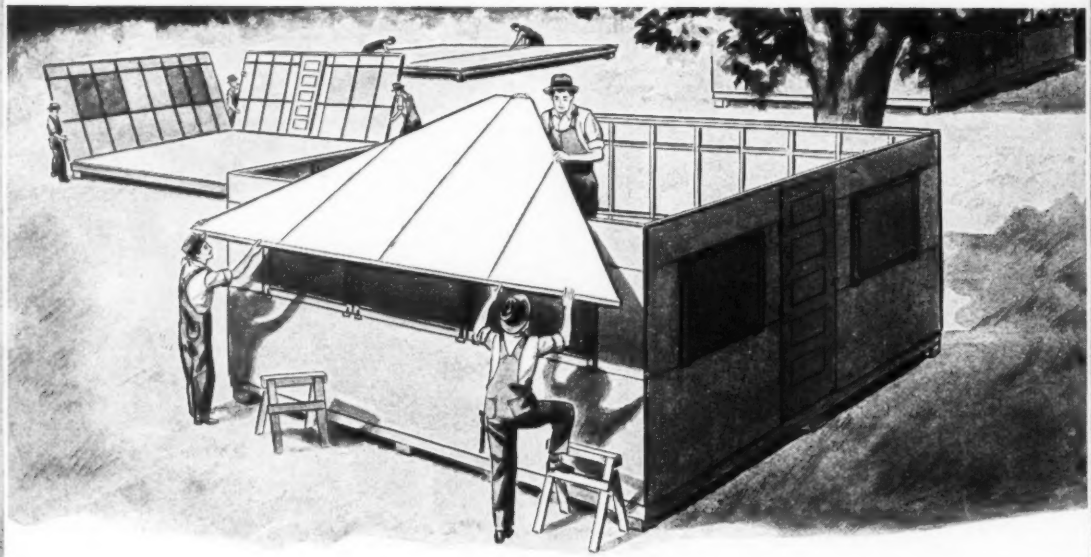
Carbide and Carbon Building Chicago and New York



SINCE 1912—THE COMPLETE OXY-ACETYLENE SERVICE FOR AMERICAN RAILROADS

The word "Oxweld" is a registered trade-mark.

Just six man-hours' time
TO HOUSE SIX WORKERS WELL!



HERE'S the answer to the fast, efficient, healthful housing of railroad workers, whether work train crews, section workers or others. It's Victory Housing, proved in war by our fighters all over the world.

Victory Housing is completely prefabricated, fully portable and demountable. It can be erected in a matter of minutes, taken down quickly and moved, re-erected or stored indefinitely; yet it is sturdy and long-lived.

Victory Housing has a double, airspace roof that provides ventilation in summer, acts as an insulating medium in winter. It is readily and economically heated and is mosquito proof.

Ten Victory Units—comfortable housing for fifty or more men—can be shipped in a box car. Available TODAY, subject to government regulations, you will be amazed at the combination of low cost and many splendid features of Victory Housing Units.

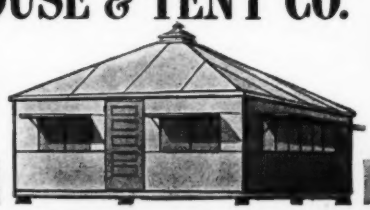
Write, phone or wire for complete information, prices and descriptive literature.

TEXAS PRE-FABRICATED HOUSE & TENT CO.

Dallas, Texas • 1245 Shoreham Bldg., Washington, D. C.

MAKERS OF "VICTORY" HUTS AND "VICTORY" HOMES

REG. U. S. PAT. OFF. REG. U. S. PAT. OFF.



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Railway Engineering and Maintenance

Commendation

For Loyalty and Resourcefulness

In a letter addressed to J. J. Pelley, president of the Association of American Railroads, on June 12, Joseph B. Eastman, director of the Office of Defense Transportation, paid tribute to maintenance of way and other railway employees for their performance during the floods that struck so many points in the middle west during the last half of May. "Despite the worst floods in history," Mr. Eastman wrote, "the total volume of railroad traffic handled during these two weeks showed a slight increase over that of the previous two weeks. Although high water halted normal freight movements at a number of points, no serious accumulation of traffic developed in the flooded areas."

Mr. Eastman referred specifically to the vital movement of oil across the flood zone to the Atlantic Seaboard as "one of the outstanding transportation achievements of the war to date." As a result of this and other comparable performances, he complimented railroad men upon "their resourcefulness and their steadfastness during the period of flood disruption. I am convinced," he wrote, "that this demonstration of efficiency and coordination during a period of adversity has taught all of us that with the return to normal, all past records can be exceeded."

The floods to which Mr. Eastman referred were widespread in the middle west, washing out many tracks and submerging others. In numerous instances, streams reached levels never before attained. Furthermore, these floods occurred at a time when the railroads were handling a record traffic, and when, therefore, any interruption was doubly serious.

In meeting this emergency, the railways demonstrated great versatility in developing new detour routes over which they could maintain the flow of traffic. Such arrangements placed sudden and heavy burdens on dispatching, transportation and mechanical forces. Nevertheless, the force of these disasters fell first and most heavily on maintenance of way forces. Not only was it necessary for them to construct many connections and to strengthen many tracks and structures to permit these detour movements, but the task was theirs to check the ravages of the water and to restore the lines to service at the earliest possible moment. The urgency was such as to demand the prosecution of this work without regard to hours of service or personal comfort. The lines were out of service—the task was to restore them at the earliest possible moment. The manner in which they met the challenge is revealed by Director Eastman's well-merited letter of commendation.

This experience typifies the problems that face maintenance men on railways throughout the country today. They are being called on to maintain the tracks and structures in condition to carry the heaviest traffic in history—the importance of this traffic to the nation's welfare is such as to demand that it be handled with the maximum of dependability. To meet these requirements, maintenance men are being given even less materials than in more normal years—with the result that their tracks and structures are becoming progressively less strong to carry the load—and they are forced day by day to work with less men.

This condition is already serious, it is steadily becoming more critical. Yet, it is an outgrowth of our all-out war effort. As such, maintenance men recognize that, regardless of the difficulties, the tracks and structures entrusted to their care must not be permitted to fail to meet the demands that are now being made and that will continue to be made upon them until victory is attained.

Heat Prostration—

Prevention Is Simple and Relief Prompt

HEAT prostration occurs primarily during hot weather, and the incidence is greater as the humidity rises, although men working around furnaces or other places when high temperatures are maintained may be subject to it at other times. It is more likely to attack men who are engaged in work that requires severe or prolonged muscular effort than those who are doing lighter work.

A person who is in excellent physical condition will come through an attack of heat prostration in far better shape than one who is below par physically at the time it occurs. For this reason, loss of sleep, too little food or an illness, such as a cold, diarrhea or other complaint that lowers bodily resistance will not only increase the severity of the attack but will leave the patient in a much weakened condition. The attack will also be aggravated if the patient is addicted to the use of alcohol or has imbibed alcohol shortly before it occurs.

Heat prostration or heat exhaustion should not be confused with sunstroke, although both come from prolonged exposure to high temperatures. Sunstroke, however, results from direct action of the sun's rays, which dislocate or disrupt the heat-regulating functions of the brain. On the other hand, heat exhaustion is caused by excessive sweating, with consequent loss of water and salt from the tissues of the body.

An attack of heat exhaustion may come on suddenly, in which event the patient will exhibit signs of collapse, with severe cramping pains in the legs, the arms and the abdomen, for which reason the trouble is sometimes known as heat cramps and heat bends. On the other hand, it may occur with slowly-developing symptoms. In this case, the first evidence of the impending attack will be loss of energy, a feeling of fatigue, a desire to let down and a tendency to do familiar tasks the wrong way. Usually, there is also a noticeable twitching of the muscles. At this stage, the impending attack can be warded off quickly and easily. If it is allowed to progress, however, these symptoms will be followed by nausea, dizziness, and a mild stupor, with rapid pulse and respiration. At this stage the characteristic cramps also appear.

Prevention is so simple that under ordinary circumstances there should be no excuse for an attack to occur. The cause suggests the remedy, for while the loss of salt from the body cannot be prevented where a person is doing heavy work and is perspiring freely, all that is needed is to restore the salt that is draining away. The salt can be taken with the drinking water by dissolving one teaspoon of common table salt to a gallon of water, in the form of tablets, one being taken with each full cup of water, or by a generous use of salt with food. So responsive is the system to this treatment that if the salt is administered prior to collapse or stupor, improvement will be shown in a matter of minutes. If, however, the attack has reached the stage of collapse and severe cramping, an intravenous injection of salt solution will bring prompt relief.

Salt taken with each drink of water will prevent heat prostration. Numerous roads now provide salt tablets for the use of both shop and maintenance-of-way employees, which can be obtained on regular supply requisitions. As yet, few roads make it mandatory that salt tablets be used, but as we enter the hot summer months, maintenance foremen should be required to keep a supply on hand and the men should be encouraged to use them freely. Labor is too scarce today to risk losing even a few hours work from any cause that can be prevented as easily and simply as heat exhaustion.

Purchases—

"The Early Bird Still Catches the Worm"

THAT most maintenance officers, faced with shortages on every hand as a result of war-time conditions, have learned that their needs for materials and supplies must be anticipated far in advance, is evident on every hand. A recent example of this is the maintenance officer, who, anticipating the storm conditions of next winter and a serious labor shortage, has already for several weeks been agitating persistently for authority to place an immediate order for approximately 5,000 additional switch heater units. With his many terminal switches already equipped with heaters of one type or another, which have demonstrated their indispensibility in keeping traffic moving under severe winter conditions, this officer's concern is now primarily with his many outlying switches, often the hardest to reach during storms, and which, per unit, require far more man-hours to keep them open than those closely adjacent to each other within station and interlocking areas.

Significant as is the reasoning employed in this regard, still more significant is the forethought and attention that is being given to this matter, hurdling the manifold problems and responsibilities of the present and intermediate months, to insure the smooth, undelayed handling of freight and passenger traffic in a winter still many months away.

It is not difficult to understand that many maintenance officers think in terms of the months ahead because, even under the normal conditions of past years, they have programed their major operations, such as rail, tie and bridge renewals, far in advance of the actual work in order to have materials on hand. The difference now is that practically all operations and needs must be planned well in advance if materials and equipment are involved, if one is not to risk delays—indeed, is not to be prevented from undertaking work entirely because of the failure to have on hand the necessary materials and equipment.

Four months ago, a check-up with railway supply manufacturers indicated that many of them, crowded with war work, had been forced to extend delivery dates as much as six to nine months—and that one of their primary recommendations to maintenance men was that they make their needs known at the earliest possible moment to simplify manufacturing and production

schedules and to advance delivery dates as far as possible. Little has happened during subsequent months to change this situation. In fact, in some respects, it has become worse. Maintenance men generally are well aware of these conditions, but it is only too obvious that some of them are much more thoughtful planners and buyers than others.

Today, immediate problems cannot be allowed to obscure the needs of the months ahead. Even to the smallest items, and regardless of the quantity, the only safe course to insure the most favorable consideration of their needs is to make an early study of these needs and to apprise the purchasing department promptly. Purchasing agents generally have urged this procedure, and many of them suggest further that maintenance officers talk over their requirements with them prior to preparing requisitions, to avoid specifications that cannot be met under present conditions and to permit the purchasing department to start its "wheels" in motion where this will facilitate deliveries when the requisitions have been approved and the orders placed. Such advance thinking must prevail throughout the maintenance ranks, from the track foreman up, if unnecessary delays in the receipt of material and equipment are not to hold up vitally essential work in the months ahead. Failure or procrastination anywhere along the line will not help and may, indeed, have serious consequences.

Boys—

Can Help Fill Gap in Maintenance Forces

IN a normal labor market, few maintenance of way officers would choose boys under 18 for routine track maintenance work. Some of the work is definitely too strenuous for the average teen-age boy, and has, in fact, been mechanized in recent years, in large part, to lessen the strain on able-bodied men.

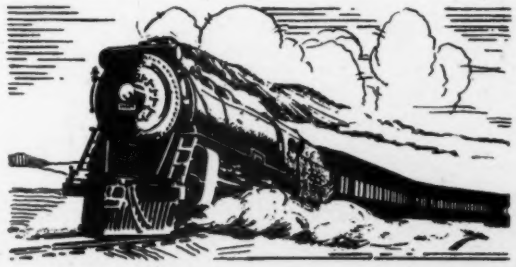
But these are not days of normal labor market, and there are many track maintenance operations that can be done by boys equally as well as by men, while, at the same time, affording them safe, healthful employment and a vitally important part in the war effort. Fortunate too, in this time of national stress, the labor laws of many states permit the employment of boys 16 years of age and older in railway track work, and a considerable number of other states have modified their more stringent laws in this respect in the interest of the war effort.

Desperately short of manpower and facing heavy maintenance programs, a number of roads have turned in a sizeable way to boys 16 and 17 years of age to fill out their ranks. Outstanding among these is the Milwaukee. On the La Crosse-River division of this road alone, as pointed out in an article in this issue, more than 500 boys are being employed for the summer months, in an expansion of an experiment which involved the employment of a considerable number of boys on Saturdays and holidays beginning with early spring. And the enlarged program, which now embraces more than 1,000 boys on the road as a whole, is working with a high degree of success. Used in section gangs and in large special gangs, some of which are housed in camp car outfits, the boys are doing a large amount of essential work—work that could not possibly be done if it were not for their employment.

While the use of boys is meeting with quite general success, it should not be assumed that these boys can be handled like men, or that they can handle as heavy work as men. The Milwaukee has found that while camp life for the boys is entirely feasible, and, in fact, is an inducement to many boys, the camps provided must be exclusively for them and that it is not advisable to mix the boys with older men in bunk or dining cars. For the boys' camps, and for even the larger boy gangs working out of nearby towns, it has also been found expedient to employ the athletic coaches or other respected representatives of the local high schools—rating them as timekeepers, material clerks or instructors—to supervise their general activities, while performing the functions of their ratings. In fact, this expedient, if not essential to the well-being of the boys, has been a large factor in winning the consent and co-operation of their parents and school authorities.

Homesickness is another problem among the camp boys that cannot be overlooked without serious consequences, and that can be overcome only by special consideration and the aid of coach-timekeepers, clerks or instructors. With this in mind, the camps, to the greatest extent possible, should be located where adjacent ground is available for evening recreation. A creek or other swimming hole will be an added asset. Even such seemingly small matters as the availability of candy and soft drinks at the camp commissary are of definite importance in keeping the boys contented, and pass privileges must be extended to the boys to allow them to visit their homes periodically. Between home visits, arrangements must be made to see that the boys can get into nearby towns on week-ends for church, a movie, a couple of "cokes" and a general period of relaxation. For those roads that are willing to give consideration to these details, plus providing the extra supervision over the boys while at work to insure their safe conduct at all times, boy extra gangs can be a great success. Roads that are not willing to adopt these measures had better not attempt large boy gangs, especially if they must be housed in camps.

The Milwaukee has been willing, and it has secured effective results, as is seen in the fact that the boys on the La Crosse-River division alone have already built nine miles of new second main track and have surfaced more than 30 miles of existing main tracks. The fact that the same number of experienced men could have done 10 or 15 per cent more work in the same period of time, without special considerations necessary where boys are employed, is beside the point. The boys are doing work that, because of the unavailability of men, could not be done otherwise.



High School Boys Fill

Labor for Victory

No. 3 of a Series

Can husky boys of 16 and 17 be employed effectively, part or full time, in track work? Do they take their tasks seriously? Should they be employed alone or with older men? Should they have separate camps? Do they present an unusual accident hazard? This article, in so far as it tells of the experience of one road, which is already employing more than 1,000 such boys on many classes of track work to help overcome a labor shortage, sheds some light on these questions

CONFRONTED with the same manpower shortage that faces the maintenance of way forces generally over the country, the Chicago, Milwaukee, St. Paul & Pacific is going a long way in overcoming this problem through the use of boys 16 years of age and older, recruited from high schools and preparatory schools in the towns and cities along its line. As early as late April, it already had more than 500 boys lined up for week-end and summer vacation work on the tracks, and more than 200 actually working Saturdays. By early June, with the closing of many schools for the summer, the number of boys working full time in extra and section gangs—by themselves, or with seasoned employees—had been increased to approximately 500, and by the middle of June, with the closing of additional schools, this number had been further increased to more than 1,000.

At first, there was skepticism in some quarters that the large-scale employment of boys would be successful. Today, however, that skepticism has given way to enthusiasm—by the schools from which the boys were recruited, by the boys, and by the road's supervisory officers.

Boys on All Divisions

That boys 16 and 17 years old can be employed effectively and safely in track work, and can be a large factor in overcoming a manpower shortage, have been demonstrated conclusively on the Milwaukee—but demonstrated with equal clarity is the fact that the use of boys in large groups demands some special considerations, especially where they are housed in camps. Fortunately, thoughtful consideration in advance to the special problems that might arise, has avoided many possible difficulties in the use of boys on the Milwaukee, and with only minor adjustments as the plan was put fully into effect, it has been a success from the start.

While the employment of boys on the Milwaukee has been open to all of the various divisions of the road, and has been taken advantage of by all of them to some extent, the La Crosse-River division, in Wisconsin and Minnesota, has adopted the plan to the greatest extent and, possibly, with the largest success. Confronted with a heavy maintenance program and a serious labor shortage, coming on top of an exceptionally severe winter and a late spring, this division had a particular need for additional labor. In addition, with nine miles of second main track to be built in an important line change between Red Wing and Hastings, Minn., completion of the season's work appeared hopeless without boy labor, about the only remaining source to draw upon.

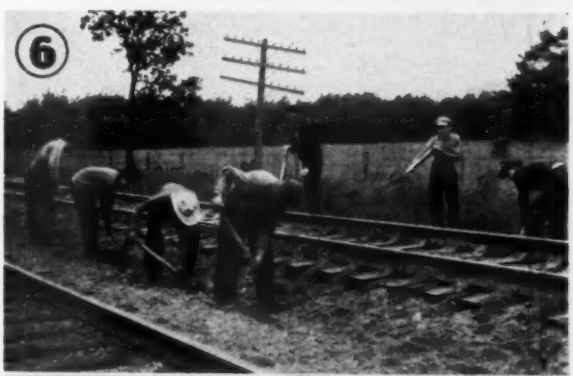
Consulted School Authorities

Many questions were raised concerning the ability to interest boys in track work, and of the advisability of hiring them in large numbers if available. Would track work appeal to city and town boys? Would their parents allow them to work away from their homes and live in camp cars? Would they take the work seriously and avoid playing on the job? Would they produce effective results, and would they present a special safety problem? All of these questions were raised largely in connection with the employment of boys in extra gangs, it having been demonstrated quite conclusively in the past that a few boys, living at home, could be

Trackmen's Shoes on the Milwaukee

employed effectively to fill out regular section gangs.

Seeking an answer to the question of whether the boys would be interested in employment in track work, working either out from their home towns daily or from camps, the railroad raised the question with a number of the school principals and athletic directors along the line. On the La Crosse-River division, the superintendent and division engineer, accompanied at times by the district safety engineer, visited the school authorities in the larger cities and towns. They explained their need for manpower in the interest of adequate war-time transportation, and spoke frankly of the classes of work to be done, and of the conditions under which it had to be done. At places, they offered regular section-gang work to the boys, with transportation on motor cars to and from work daily. At a number of other towns they offered the boys extra-gang work, with motor car or bus transportation to and from their home headquarters, and at still other places, they offered camp life to the boys, in camps exclusively for them. To insure proper supervision of the boys in the camps and while at work, reassuring principals and parents of favorable conditions, they offered to employ the athletic coaches of the local high schools to live and work with the boys. Even in the case of the large extra gangs of boys to be worked from their home towns, the road



Views of the Boys at Work On the Second-Track Project Between Red Wing and Hastings, Minn.—(1)-In One of the Camp Bunk Cars; (2)-The Camp Boys Return to Their Headquarters for Lunch; (3)-Making the First Raise on Gravel Ballast; (4)-Final Lining of the Track; (5)-Spacing Ties; (6)-Filling in the Track; (7)-Power Tamping the Final Raise

offered to hire the local athletic coaches to supervise conditions and to stimulate the general morale.

Wide Acceptance of Plan

Almost without exception, the plan appealed to the schoolmasters, and, in turn, to a large number of the boys, many of whom were eager for the opportunity to have a definite part in the war effort, to earn good wages, and, in some cases, "just to be able to work on a railroad." The chance to help build a new piece of main track had a special appeal in many cases, and in a short time applications for work exceeded the need.

The High Camp and Boarding Standards Maintained by the Milwaukee Have Been An Asset in Securing and Holding the Boys

Early in April, the La Crosse-River division began employing boys on Saturdays, and had approximately 70 at work during the four days of the Easter school vacation. On June 12, completing the first week of the boys' camp on the new second-track project, it had a total of 141 boys working on the second-track construction alone, including 49 in the camp, 51 in a day gang from Red Wing, and 41 in a day gang from Hastings. In addition, it had an 100-boy gang working out of Wausau, Wis.; a 35-boy gang working out of La Crosse, Wis.; a 35-boy gang working out of Viroqua, Wis.; a 40-boy gang working out of Portage, Wis.; a 40-boy gang working out of Watertown, Wis.; a 20-boy gang working out of Wisconsin Rapids, Wis.; and from three to six boys working regularly in a large number of section gangs.

That other divisions were showing similar interest in boy gangs at the same time, is seen in the fact that, in addition to the employment of large numbers of boys on these other divisions for section and extra-gang work, working daily from home headquarters, there were by early June an 100-boy camp at Freetown, Ind., on the Indiana division; a 90-boy camp at Spencer, Iowa, on the Iowa division; an 130-boy gang at Lena, Wis., on the Wisconsin division; and a 50-boy gang at Madison, S. D., on the Iowa & Southern Minnesota division.

Almost without exception, the boys employed in section gangs, and in the camp gangs, are carried to and from work on motor cars and trailers. In the case of the large day gangs out of the principal towns, transportation for the boys is either by motor cars and trailers or by highway buses, depending upon which type of equipment is available and which is best adapted to reaching the locality of the work.

Wide Range of Track Work

For the most part, to date, the boys, whether in section or extra gangs, have been employed in spot tie renewals, spot surfacing, and in general track raising and surfacing operations. In fact, with a large program of such work ahead, it is expected that they will be employed largely on these classes of work throughout the summer, although it is the plan to use the boys in other operations, including rail laying, as necessary, assigning them the tasks for which they are best fitted.

Boys in a Regular Section Gang Renewing Ties in Main Track Near Red Wing, Minn.

On June 12, the boys employed on the second-track project included the 49 living at the camp, the 41 working out of Hastings, and the 51 working out of Red Wing. The boys at the camp, which were increased in number to nearly 100 by the last week in June, were recruited from La Crosse, Wis., Emery, S. D., Austin, Winona, Adams, St. Paul and Minneapolis, in Minnesota. By June 12, all of the ties over the entire nine miles of second track had been lined up on the new grade by the boy laborers; more than eight miles of the rails had been laid by a mixed crew of boys and experienced track men; and nearly six miles of the track had been fully ballasted and lined and surfaced by the boys alone. All ties, rail, joints and fastenings were unloaded by regular section men from supply trains operated on the existing adjacent main track. The job facing the boys, with help from the older track men only for setting the rail in place, spiking, final tightening of the joint bolts with a power wrench, and applying anti-creepers, was to complete the line for 100-mile an hour train operation—a job which had an unusual appeal.

Starting by working week-ends, and then regularly six days a week, the boys were first employed carrying the ties over onto the new dump and laying them in approximately final location. Later, after the rail had been unloaded onto the ties by an experienced rail unloading crew, the boys were employed progressively distributing spikes, bolts, tie plates, joint bars and anti-creepers; oiling rail ends, and fitting up joint bars, complete with R.M.C. joint packing; spacing ties; nipping up ties for the spike drivers; assisting in unloading gravel ballast; raising track and shovel-tamping the first raise; final power tamping of the ties and lining of the track to finished surface and line; and final filling in and dressing of the ballast section.

In the early work, all of the boys from both Red Wing and Hastings were employed in lining up the ties on the subgrade. Subsequently, as the work got fully under way, and the camp was established, the boys from Hastings, working with a group of about 30 older men, proceeded with the rail laying work, while the camp boys, supplemented by the boys

brought out daily from Red Wing, undertook the ballasting and surfacing operations. That effective work has been done under this arrangement is seen by the fact that at the present time the entire job is practically completed, well ahead of schedule.

The Camp

The camp on the second-track project, as first constituted to house 56 boys, consisted of two coach-type bunk cars, each with double-deck bunks for 28 boys; a box car, fitted with 12 shower baths; a box car equipped with two 1000-gal., wood water tanks, for supplying water to the showers and for all other camp purposes; a coach-type dining car, with transverse tables seating 60 and a separate compartment for serving the foremen and other supervisory officers; a kitchen car, with facilities for heating the shower bath water; two timekeeper and foremen bunk and office cars; a commissary car; an equipment car, housing a pump for distributing the water supply, and a engine-generator set to supply the train with electric lighting throughout; and a coal supply car. When the camp gang was built up to approximately 100 boys, the only change in the camp train was the addition of two additional bunk cars, another diner, and a second commissary car.

The camp is similar in equipment and facilities to the other boys' camp trains on the road, and to the camps assigned regularly to large extra gangs of men. It has a generally good appearance, both inside and out, is fully screened, and is well maintained. It is operated by a boarding company, the same as the other camps on the Milwaukee, and to the same general standards, with the single essential difference that most of the commissary help, like the "track men" quartered, are boys.

Careful Supervision

Proper supervision over the boys, both in the day gangs and in the different camps, is a matter to which the Milwaukee has given special attention. In every case, the boys are entrusted only to experienced foremen, who either have boys of their own, or who have the natural ability to get along with and to direct boys. Where only a few boys are employed in an otherwise stable section crew, usually from a small town, no special problem has been encountered, the foremen frequently having had a long-standing acquaintance with the boys' families, if not with the boys themselves, and accepting the personal responsibility for their welfare.

In the larger boy gangs, foremen supervision is selected with great care, and accompanying the gangs, to assist in maintaining proper deportment and good morale, is generally a man with whom the boys have been associated in school—usually their athletic coach, but in one case a school principal, and in another, a superintendent of schools. These men stay with the boys throughout the working hours, travel to and from work with those boys living in nearby towns, and live night and day with those boys housed in the camps. In each case, they are employed with ratings of timekeeper, material clerk or instructor, carrying the responsibilities of these particular assignments, as well as that of looking out for the general welfare of the boys.

Applying New Bars and Joint Packing on the Nine Miles of New Second-Track Between Red Wing and Hastings, Minn.

Boys Have Assembled and Wrench-Tightened All Joints in the Second Track Project, Leaving Final Tightening of the Bolts to Men With Power Wrenches

Typical of the supervision given to the boy gangs is that afforded the 140 boys that were working on the nine-mile second-track project on June 12. At that time, all of the rail laying and track surfacing work was being done under the supervision of one general foreman and three foremen, one machine operator, and three athletic coaches—one functioning largely with the 41 boys from Hastings, another largely with the 51 boys from Red Wing, and the third assigned to the camp gang.

In Minnesota, existing laws permitted the employment of boys 16 years of age in railroad work, but in Wisconsin this was possible only after modification of existing child labor laws, lowering the age limit to 16. In Minnesota also, the law permits 60 hours of work a week for boys, while the Wisconsin law permits a work week of only 48 hours. Thus, within Minnesota, the boys working on the railroad are employed ten hours a day for six days a week, whereas in Wisconsin, they are employed only eight hours daily for six days.

In all cases, the boys are paid the prevailing rate of extra-gang laborers or section men for eight hours, depending upon the character of their employment, with time and one-half for the ninth and tenth hours for those boys permitted to work ten hours. In addition, all of the boys are provided with free transportation to and from work daily, and the camp boys are given periodic pass privileges to allow them to visit their homes, with deductions from their pay for their board at the prevailing rate on the road.

Safety Is Stressed

Safety is given major consideration in the employment of the boys, and all other factors are subordinated to that end. Wherever employed, the safe conduct of the boys is put up

(Continued on page 517)

Cropping Rail in Track Conserves

FACED with greatly increased traffic on all of its important lines and not being able to secure enough new rail to relay all lines that needed it, the Southern has been cropping rail in track on its important freight line between Louisville, Ky., and St. Louis, Mo., to improve track conditions and enable this line to withstand the wear and tear of increased traffic for the duration and, possibly, for some time thereafter.

The rail cropping work is being done by a 66-man gang, equipped with eight Racine power rail saws and also with power drills, bolters, grinders, adzers and a creosote spray machine. Since August, 1942, this gang has cropped the rail in 42 miles of track west of Huntingburg, Ind. The rail is of 85-lb. open hearth A.S.C.E. section, 33 ft. long, rolled in 1921. It is estimated that six years of additional service life will be obtained by the cropping work, and that the reduction in maintenance costs, because of better joint conditions, will approximate 10 per cent.

Increased Traffic

The line between St. Louis and Louisville has always been an important freight line for the Southern, furnishing that system with its only connection with St. Louis. About two years ago the line west of Huntingburg handled about 14 trains daily, of which two were passenger trains. Today from 22 to 26 trains daily are being operated over this division. Much of this business has been and still is refrigerator traffic. This increased business has been taking its toll of the 85-lb. rail in this line and the joint conditions were becoming increasingly bad. Because of brine corrosion and wear on the fishing surfaces of the rail and joint bars, tamping and surfacing were only temporary expedients and the joints soon were down again.

After giving considerable thought to the problem, it was decided, since new rail was out of the question for the time being, to crop the old rail in track and apply new joints. As a result, each rail is cropped far enough from the old ends to eliminate the fishing wear and corrosion from brine drippings that is concentrated at the ends of and under the joint bars.

To do this work, the Southern purchased 10 Racine rail saws, 6 Nordberg track drills and 3 Nordberg grinding machines. After considerable experimentation to develop a balanced, efficient gang organization, the following equipment has been set up for a gang of 66 men, including one extra gang foreman and one assistant foreman:

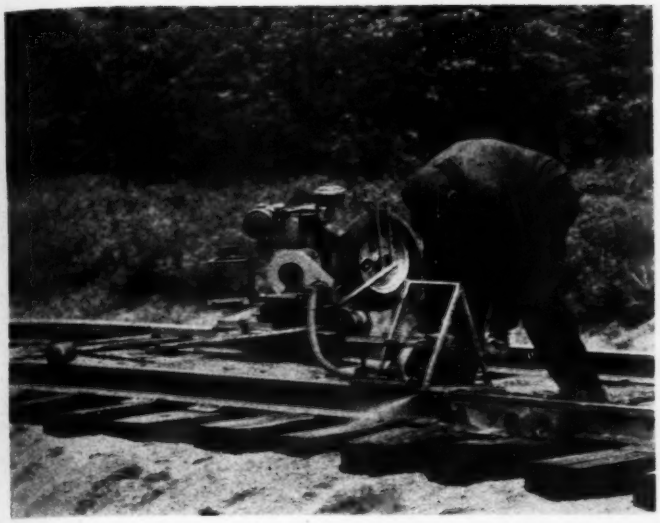
8 Racine rail saws
3 Nordberg track drills
2 Nordberg flexible shaft grinders
2 Nordberg adzing machines
2 Nordberg bolt tightening machines
1 Woolery creosote spray machine

With this equipment, extra rail saws and rail drills are kept for emergency or spare use in case of repairs.

General Outline of Work

In general the gang works eight hours, although the lunch hour is adjusted occasionally to fit traffic conditions. The operating department assists, during the working hours of the gang, in bunching trains as much as practicable to help keep delays down to a minimum. The gang works on the rail in one side of the track at a time. Eighteen inches are cut off each end of the old rail, reducing its length to 30 ft. This increases the number of joints per mile from 320 to 352 and requires that an extra 30-ft. rail be laid on each side for each 10 rail lengths of the newly cropped rail. The additional rail is cropped at Huntingburg, and unloaded in advance along the track. The old joints (85-lb. A.S.C.E. Weber joints with a wood filler) are replaced with new head-free 100 per cent 85-lb. 24-in. 4-hole, joint bars and all ties not already tie plated or plated with small tie plates are plated with new 7-in. by 11½-in. tie plates.

All material is unloaded and distributed in advance by the local section gangs, except the additional rail, which is unloaded at the proper points directly alongside the track, using the local freight train for this service. On sharp curves where the



Since August, 1942, the Southern has used a mechanized 66-man gang equipped with eight Racine rail saws to crop rail on its St. Louis division. It is estimated that this work adds at least six years to the life of the rail and its success has led to the establishment this year of other gangs for cropping rail in track on the Central and Eastern lines of the Southern

From Left to Right—Six of the Eight Saws, Two at Each Joint, Cropping Rail Ends. Loading a Saw on a Dolly After a Cut Has Been Completed. Slot Grinding Ahead of the Saws

Steel on the Southern

rail is so curve-worn that several years additional life cannot be obtained by cropping it in track, enough 85-lb. rail is cropped to a length of 30 ft. at Huntingburg and unloaded to relay the curves out of face. On lighter curves the rail is cropped in the same manner as on tangent track. The cropped rail is laid with broken joints on 15-ft. centers.

Gang Operations

The gang consists of 1 extra gang foreman, 1 assistant extra gang foreman, 17 machine operators, 4 machine operator helpers and 43 laborers. Their operations in sequence, are as follows: One laborer marks the rail at the point it is to be cropped and the location of the new bolt holes, using a sledge and a specially designed tool. This tool has five spring-return center punches and a clamp welded on a small steel frame. It can be clamped quickly to the ball of the rail at the proper distance from the end and the operator then strikes the punches with a sledge marking the top of the ball for the saws and the side of the web for the rail drills. Three operators and 3 laborers follow the marker, equipped with 3 Nordberg Model BD power rail drills and drill two 1-in. holes in the web at each end of the rails for the new joints.

One operator and a laborer, equipped with a Nordberg Model UG flexible shaft grinder, grind a slot in the ball of the rail at the point where the saws are to crop the rails. The grinder is equipped with a portable grinding head attachment which is clamped to the rail and with an 8-in. by ⅛-in. grinding wheel. The slot is ground to a depth of about 3/16 in., cutting through the cold-rolled or hardened running surface of the rail. This operation speeds up the rail saw work and nearly doubles the service life of the saw blades. An 8-in. by 3/16-in. grinding wheel was also tried for this work, but the 8-in. by ⅛-in. wheel was found to be more satisfactory, since the 3/16-in. slot permitted the saw blades to vary from the center of the slot.

Following the slot-grinding machine, one operator and one helper with a Nordberg Model BW bolting machine remove the nuts from the bolts in the joints, eight laborers with claw bars pull the track spikes and one laborer with a sledge knocks off the joint bars.

As soon as the old joint bars are removed, 8 saw operators, each equipped with a Racine Model 15 power saw, crop the rail ends, sawing the rails through at the point where the ball is slot ground. The saws are operated in groups of two at each joint and as soon as a cut is completed, they are loaded onto dollies and are pushed ahead on the opposite rail. Five laborers are equipped with five specially-constructed dollies for moving the saws. These men are assisted in loading and unloading the saws by the machine operators and each, as soon as he has moved one saw ahead, drops back to get another saw. One dolly can handle two saws and sometimes two are moved ahead at one time.

Following the rail cropping, the new rail ends are chamfered on the top and side of the ball to prevent end-flow and subsequent chipping. An operator and one laborer, equipped with another Nordberg flexible shaft grinder, do this work. This grinder is equipped with an 8-in. by 1-in. grinding wheel, and the ball of the rail is given only a slight bevel extending back about 1/16 to ⅛ in. on the surface of the ball and down about ⅛ to 3/16 in. on the face of the rail end. Only a slight bevel or chamfer is necessary because the running surface of the old rails has already been hardened by traffic, and experience has shown that little additional flow will develop. One laborer, equipped with a brush and a bucket of asphalt metal preservative, paints the new rail ends and the inside surfaces of the new angle bars with oil.

Two laborers with lining bars follow, lining the cropped rail into the center of the track. One laborer removes the old tie plates, using a clay pick for this work, and two laborers drive down broken spike stubs with a sledge hammer and a pointed spike driver. Two laborers plug the spike holes with creosoted tie plugs and two laborers drive down the plugs, using bars with flat ends. Two operators and two helpers follow, adzing the ties with two Nordberg adzing machines. Two laborers then apply creosote to the freshly adzed surfaces of the ties with a Woolery

creosote dispenser, following which one laborer places the old or new tie plates back on the ties.

The 11 laborers who pull spikes, knock off rail joints and line the rail in are also used to relay the cropped rail. These men leave their claw bars when they come to the limit assigned by the foreman and drop back to set the cropped rail back in place. Eight of these men carry the rail back and set it in place, using rail tongs. One man does the calling for the rail tong men and places the expansion shims. The two others apply the new joint bars, starting the nuts on all four bolts. The nuts are tightened by another Nordberg bolting machine, operated by one operator and a helper. The bolting machine is followed by two sets of gagers consisting of three men each, two of whom spike while one man nips the tie. The gagers spike every third tie to gage and when closing up for trains, the entire gang sets the machines off the track and drops back, spiking up in full.

In addition to the above-mentioned men, one laborer carries drinking water for the gang and another laborer supplies the machines with fuel and water, including water for the tanks on the rail saws which furnish a small stream of water on the rail head alongside the saw while the rails are being cropped.

Two flagmen complete the personnel of the gang. These men are sent out with instructions to flag all trains until relieved or otherwise advised. Trains are also given a warning order by the dispatcher so that they will be on the lookout for flagmen. The work is planned, however, so that passenger and manifest freight trains are seldom delayed. This is done by obtaining lineups and by careful planning of the work. The track is usually closed up just preceding the arrival of the train, and when the track is safe, the flagmen are advised so that the train may be allowed to pass without being stopped.

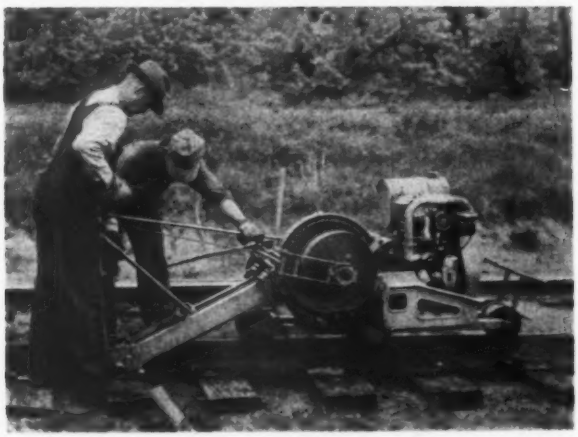
Production and Costs

The gang carries two 15-ft. sections of 85-lb. rail, so that the cropping work can be closed when five or any multiple of five rails have been cropped. The rail saws can make a cut in from 3 to 5 min. and a 10-rail section (on one side) can be cropped and relaid with 11 rails 30 ft. long in from 30 to 40 min. Correspondingly, a five rail section can be cropped and relaid in about 15 to 20 minutes. This allows the gang to take advantage of a 20-minute interval between trains. Considerable time is lost with the passage of each train, however, before gang operations are completely resumed with all the machines again in operation and properly spaced. For example several rails must be drilled and cropped before the adzers can start work, so that each train means a delay of approximately 30 minutes, during a short part of which period the gang is not operating at all and during the remainder its efficiency varies from zero to 100 per cent.

The record production of this gang is 263 rails cropped in one day. This record was made during a day in which very little interference was experienced from traffic, since most of the trains during the working hours of that particular day passed during the noon hour. Traffic interference is usually a considerable factor, however, since about 50 to 60 percent of the 22 to 26 trains operating daily in this territory pass during the working hours of the gang. Because of these conditions, the average production is about 150 rails cropped per day.

The cost of cropping the rail with this gang has fluctuated from $0.98 to $1.26 per rail end cropped. This fluctuation has been caused partially by the variations in traffic interference explained above, and also because of weather conditions, the cost increasing in inclement and severe winter weather. The average cost has been about $2.20 per rail, or $1.10 per rail end cropped. This cost includes all of the above gang operations except the adzing. The time of 2 machine operators, 2 helpers and 10 laborers is considered as added because of the adzing work and is not included as part of the actual cost of the cropping work.

Drilling the New Bolt Holes in Advance with a Nordberg Drill



Bolting Up After the Rails Have Been Cropped and Moved Back

Follow-Up Operations

After the rail is cropped and relaid, the new joints are usually in excellent surface, since the rail wear is uniform, and they do not require welding or grinding. This is not always true, however, where the additional rails are laid, and rail ends at these points are built up to surface, if necessary, with oxy-acetylene torches. Immediately after the cropping gang has passed, the track is smoothed and lined by the section forces to make sure that it does not become surface-bent at the locations of the old joints before a gang can surface the track out-of-face.

Within a few weeks the track is given a three to four-inch raise out-of-face on new ¾-in. to 2½-in. limestone ballast. About three weeks

(Continued on page 517)

Scrap Turntable Girders Converted Into Bridge Span

By S. M. Smith
Former Bridge Engineer
Gulf, Mobile & Ohio

IN these days when the conservation of steel has become so vital to our war effort, engineers are turning their attention to the utilization of materials on hand, which, until recently, could command only a scrap value price. An example of what is being done is a project undertaken recently on the Gulf, Mobile & Ohio, in which two second-hand 60-ft. turntable girders and a number of 15-in. channels salvaged from the center sills of dismantled car frames were converted into a 40-ft. half-through plate girder span. No new material was used in the reconstruction, except rivets and bolts, connection angles and detail materials being salvaged from the scrap ends of the girders.

Corrosion Negligible

In spite of the fact that the turntable girders had been stored in a yard for many years without protection of any kind, corrosion was practically negligible, as they were of wrought iron. The flange angles were 6-in. by 6-in. by ⅝-in. with 12-in. by ½-in. cover plates, and the web ½ in. in thickness. It was desired to construct the maximum length of span obtainable for E-50 loading, which was found to be 40 ft. center to center of bearings.

One of the requirements of the construction was that no steel should extend above the top of rail, and, in complying with this requirement, it was possible to reduce the transverse spacing of the girders to 7 ft. 6 in. Floorbeams were 15-in. channel section, which were spaced 2 ft. center to center, alternate beams being attached to the outstanding legs of the stiffeners. By using an additional connection angle at these points, eccentric connections were avoided. The connection angles for the floorbeams between the stiffeners were cut from the angles of the salvaged ends of the turntable girders, in each case making use of the existing holes in them for the new connections.

End Bearing Design

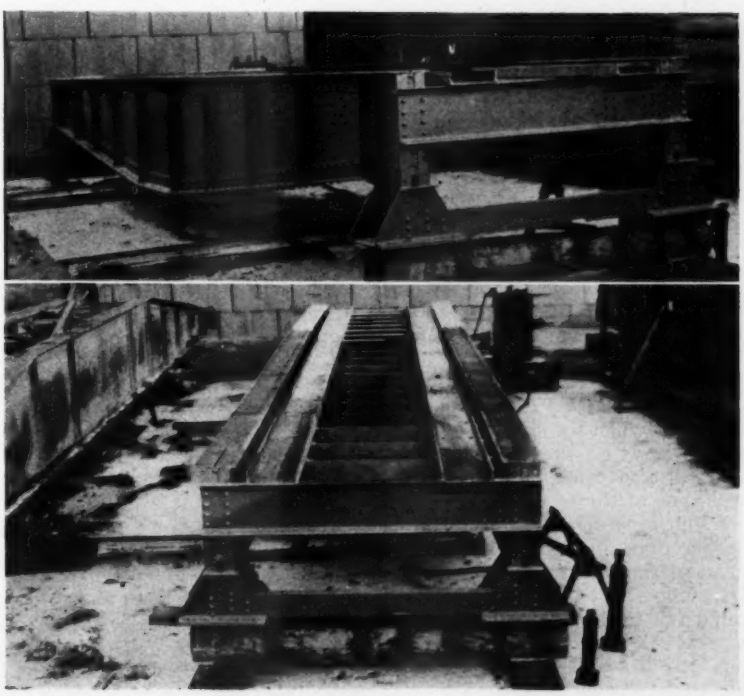
In cutting off the ends of the girders, the upward slope of the bottom chords made the formation of the shoes a problem. This was overcome by making the end posts, or end stiffeners, and the shoes integral with the girders. The outstanding legs of the bottom flange angles were cut back for a distance of 15 in. from their ends to permit vertical channels to be attached, extending below them sufficiently to permit the formation of a shoe, which in turn was made up of short sections of channel attached horizontally. The base plates were salvaged from a portion of the webs removed from the scrap ends of the girders.

All holes were drilled 13/16 in. for ¾-in. rivets. The structure was riveted up completely, as the over-all dimensions were not in excess of those allowed for shipment. Upon the completion of the riveting, the entire structure was sandblasted and given a coat of red lead and oil.

One unusual detail of the structure was that it eliminates the use of bridge ties. Instead, the running rails are to be carried in longitudinal channels, the outstanding legs which act as guard rails in case of a derailment. The rails will be attached to the channels at points midway between the floor-beams by means of bolts and clip angles. It was first thought that this type of floor would be noisy, and provision was made for inserting a cushion later if found necessary, but in a bridge of similar floor construction, without cushioning, that was erected recently, noise was not found to be objectionable.

Cost of Assembly

The computed weight of the finished structure was 38,200 lb. and the assembly cost was about 2.25 cents per pound. The work was done in a yard where compressed air was available. The structure was riveted up completely, with the exception of some sidewalk brackets, and will be shipped as a unit for erection. The work, which was carried out under the direction of L. P. O. Exley, chief engineer of the road, was done under the supervision of the writer.



Top Below—Corner View Showing Detail of End Posts and Shoes. Bottom—View Showing Longitudinal Channels for Rail Support

Why Motor Cars Shimmy—How It Can Be Corrected

By George R. Westcott

Assistant Engineer,
Missouri Pacific, St. Louis, Mo.

SHIMMYING is an annoying characteristic of some motor cars. It is not only tiring to those who ride on them for any considerable distance, but it is inclined to distract their attention and, in extreme cases, to affect their ability to observe small details or detect track defects for which they may be watching. At the outset, however, in considering the tendency of motor cars to shimmy, one should be careful to distinguish between this action and nosing. The two are quite different in their causes, effects and the remedies necessary to overcome them.

Causes of Nosing

Nosing, as it is applied to motor cars, is the tendency for one front wheel to hug one rail continuously. It does not disturb the smooth running of the car, but causes unnatural wear on the flange of the wheel, and may be a contributiing cause of a derailment because of the tendency of the wheel to climb the rail. Unless there is proper inspection, this wheel may become so worn in the throat of the flange that the flange may separate from the tread, and result in a serious accident.

A variety of causes are responsible for nosing. A car may be "out of tram" or, if the frame bolts are loose or the frame members are weak, it may warp out of tram when power is applied in running, although in the latter case the tram may appear to be correct when the car is standing. Drive wheels of unequal circumference will also cause nosing, because the larger of the wheels travels farther during each revolution, thus causing that side of the car to run ahead of the other side, slueing the car. A loose thrust collar will permit an axle to shift slightly or a worn loose-wheel bushing will cause the wheel to wobble. Either of these defects may cause nosing.

The remedies for nosing are obvious. If the car is held properly in tram, if the drive wheels have the same circumference, if the thrust collars are tight and if the wheel bearing is in good condition, there is small probability that the car will nose. These are matters that every motor car maintainer should watch closely, for there is a hazard involved in allowing a motor car to nose.

Shimmying Is Different

On the other hand, shimmying is the tendency for the flange, first of one front wheel and then of the other, to thrust against the rail. This action also results in unnatural wear in the throat of the wheel flange, but in this case both front wheels are affected. However, until the flanges become worn to the point where they are likely to fail, there is little hazard from a shimmying car. The principal effect is to cause the car to ride rough. Although those riding on the car may be apprehensive that it is about to leave the track, this rarely happens.

Invariably, the tendency to shimmy varies with the speed and the wheel base of the car. In other words, the shorter the wheel base, the lower the speed at which shimmying is likely to start. For this reason, it is most common on cars of the one-man or light-inspection type.

Following the MCB practice for freight and passenger cars, motor-car wheels were made originally with a 1-in-20 slope on the tread. Because of this slope and the lateral movement permitted by the difference between the wheel gage and the gage of the track, it is possible for a pair of driving wheels having a tread slope of 1 in 20, to position themselves laterally on the rail so that the effective diameter of one will be greater than that of the other. If the effective diameter of the right-hand wheel is the larger, it will cause the right-hand side of the car to run ahead of the left-hand side. This will cause the car to thrust itself against the left-hand rail. Running in this position, the left-hand driving wheel then assumes a position on the rail, which gives it the greater effective diameter, causing the left-hand side of the car to run ahead, thus reversing the previous action. This side-to-side movement, being repeated at intervals that shorten as the speed increases, produces the effect we call shimmying.

Understanding of this effect led to the adoption of a wheel tread for motor cars with a slope of 1 in 50, which is now in general use. With this flatter slope, the lateral position of the wheels does not change the effective diameters of the wheels to so great an extent, for which reason the tendency to shimmy is not now so common as it was formerly.

Not Yet Overcome

Shimmying has not been overcome completely, however, for in service, wheel tires having a tread slope of 1 in 50, take on tread contours that are quite different from a uniform slope. This results partly from wear on the tread, but more particularly from the fact that the tread becomes "dished" or concave from pounding on the rail. When this occurs the effective diameter of each driving wheel again depends on its position on the rail, and again conditions conducive to shimmying are set up.

As will be understood from a study of this subject, the gage of the wheels is an important factor. The narrower the gage to which the wheels are set, the more lateral movement is possible, and the greater the possibility of having the effective diameters of the wheels differ from each other. Recognizing this, some roads have adopted the practice of widening the wheel gage on motor cars, thereby reducing the tendency of the cars to shimmy. This practice usually results in greater wear on the wheel flanges, however.

It should not be overlooked that, while the basic causes of shimmying are those that have been mentioned, there are other factors that contribute to this action or tend to aggravate it. As in nosing, worn loose-wheel bushings or loose thrust collars on the front axle may be contributing factors. In other words, if a motor car demonstrates a tendency to shimmy, one should first examine the condition of the treads of the driving wheels and then examine the car for other contributing defects.

For good operation, it is essential that both of the driving wheels on any axle have the same circumference. To this end, the wheels or tires on both ends of the driving axle should be renewed at the same time. If it becomes necessary to change the tires or wheels because of nosing or shimmying, before their full service life has been attained, they can be used on the front or loose-wheel axle without detrimental effect.

Lackawanna Welds Rail Ends at Night

Above—The Welders Are Reported To Work as Efficiently at Night as During the Day. Left—A Surface-Grinder in Operation at Night. The Automobile Spotlights on the Machine Are Not Visible in This View

In its electrified commuter territory adjacent to New York City, traffic is so heavy in the daytime that the building up of battered rail ends during regular working hours is at best an inefficient operation. As described in this article, the problem has been solved by doing the welding at night when it is possible to obtain unrestricted use of a track for a full working period

BATTERED rail ends are now being built up by welding at night with highly satisfactory results in a territory on the Delaware, Lackawanna & Western where a high density of traffic during regular hours makes it impossible to do the work efficiently in the daytime. In this night work, which has been a regular practice for several years, the unrestricted use of the track is obtained for the working period, and the work is done in an "on-track" operation in which the welding gases and all other materials required are moved forward as the work progresses. For the most part, the Lackawanna's standard on-track welding organization and equipment are used in the night operation except that the surface grinders are equipped with electric spotlights for illuminating the work.

Two Types of Gangs

Two general types of organizations are employed in building up battered rail ends on the Lackawanna. One of these is a small "off-track" organization, with one welder, which works under traffic. Gangs of this type make use of a self-propelled off-track carriage, powered by a gasoline engine, for moving the gas cylinders forward as the work progresses. Both the cross grinding and the surface grinding of the welded rail ends is done with a light dual-purpose unit with a surface-grinding head at one end and a cross-grinding wheel at the other. Utilizing this equipment, that is, the tank carriage and the dual-purpose grinder, it is reported that battered rail ends are being built up under traffic with a high degree of efficiency by the off-track gangs, each of which consists of only three or four men.

The other type of welding organization on the Lackawanna is an "on-track" outfit, with four or more welders, in which the gas tanks are carried on push cars that are moved forward with the work. This organization is employed where unrestricted use of the track can be obtained, either solely for the welding work or to permit a number of different types of work to be performed without interference by traffic. Also, this organization is employed to weld rail ends under traffic at locations, such as in yards, where an adjacent track is available on which the push cars can be placed and moved forward as the work progresses. Standard surface and cross-grinding equipment is used with this organization.

Traffic Is Heavy Here

On one portion on the railroad the density of traffic is so great during certain parts of the day that neither of the two organizations described above can be employed with full efficiency during daylight hours. This is in the vicinity of Hoboken, N. J., the eastern terminus of the Lacka-

The Cross-Grinder Operator Uses a Kerosene Lantern for Illumination

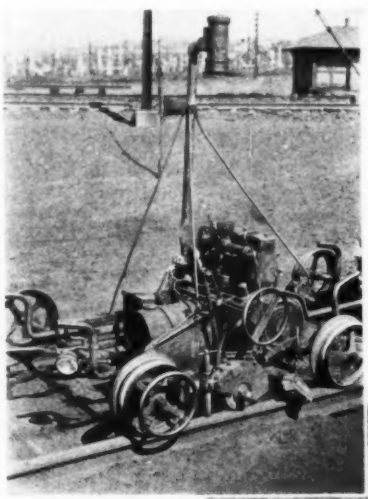
wanna, where, in addition to its regular through freight and passenger business, the Lackawanna carries a heavy commuter traffic from and to New York City. In the territory carrying this traffic, which is electrified and has two to four tracks, there is an extremely high density of traffic during the morning and afternoon rush hours, and even during the interim there are train movements at least every 30 min., and, on part of the territory, every 15 min.

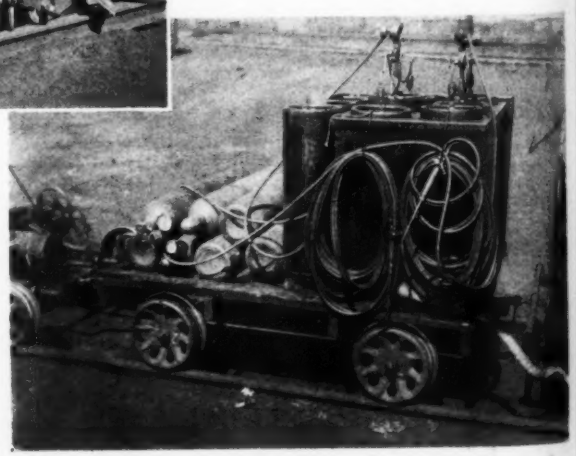
Since it is not possible to obtain unrestricted use of any main track in this territory for more than six hours during the daytime, a welding gang of the on-track type can be used with only a fraction of its potential efficiency. Even when an off-track organization is used to build up rail ends in this territory the work is subject to such frequent interruptions because of train movements that the efficiency and output are greatly reduced. In fact, it has sometimes been the practice when gangs of this type are used to obtain the use of the track for as long a time as possible as a means of increasing the production of the gangs.

Night Work Succeeds

Because of the difficulty of using either type of welding organization in the electrified territory with efficiency during daylight hours, the idea was conceived several years ago of doing the work with the on-track organization at night when unrestricted use of sections of the main tracks could be had for the full working period. When put into effect, this plan proved so satisfactory that it is now an established practice.

Only minor changes in equipment and organization were necessary in adapting the on-track organization to function at night. However, for several reasons it is felt that a detailed description of the night operation is justified here. In the first place, the on-track type of track-welding organization, i.e., one in which the gas cylinders are carried forward on push cars, requiring that full use of the track be had, is sufficiently unusual in itself to warrant detailed consideration. Not only does this system have the obvious advantage that the welders are able to work without interruption by passing trains, but it also results in considerable economy in the handling of the cylinders. A second reason for describing the work in detail is that, in its track-welding operations, the Lackawanna uses several attachments and devices that have proved highly effective.





Above—This View of a Surface Grinder Shows the Two Automobile Spotlights, the Automatic Stop and the Elevated Air Intake. Right—One of the Push Cars That Are Used for Carrying the Gas Cylinders

Four Welders

At night, as well as during the day, the on-track welding organization is normally built around four welders. These work in pairs and for each pair a push car is provided that carries sufficient gas cylinders for the night's work. Using 50-ft. hose lengths, each pair of welders builds up the rail ends in alternate groups of four joints, two in each rail.

The acetylene cylinders on each of the push cars are enclosed in a metal box, the interior of which is heated during cold weather by piping into it, through a flexible hose connection, the exhaust from a motor car, this being done to cause the acetone in the cylinders to release a maximum of its acetylene. Each box contains six cylinders which are manifolded in two groups of three each. The box has a removable cover, with round holes to fit over the tops of the cylinders, and one of the side walls is in the form of a vertically sliding door that facilitates the removal and replacement of empty cylinders. For use in the event that the gas in the cylinders in the box should become exhausted during the working period, three extra cylinders of acetylene are provided on each push car outside the box. Six or seven oxygen cylinders are also carried on each of the push cars.

Grinders Have Lights

Following directly behind the welders are two Nordberg surface grinders, each with an operator and a helper or pusher. To adapt these

for use at night, each surface grinder is equipped with two automobile spotlights, a generator and a storage battery. One of the lights is clamped to the grinder carriage in such a position that it illuminates the grinding operation, while the other is fastened to one of the lift handles at the rear of the machine in such a manner that it casts light on the surface of the rails at the joint when the grinder is moved forward slightly to permit the operator to test the rail ends with a straight edge.

Incidentally, these grinders, as well as all other surface grinders used in connection with rail-end welding work on the Lackawanna, are provided with an attachment that automatically regulates the depth of the surface-grinding operation. This is in the form of a stop consisting of a vertical threaded spacer bolt that extends through a sleeve fastened to the grinding-wheel guard. This stop is provided with a lock nut and has a steel ball inset in its lower end that permits it to roll freely on the rail surface. To set the stop for the grinding operation, it is turned down until the lower end comes in contact with the surface of the rail at a point outside the limits of the weld, and is locked in this position.

What the Stop Does

Being fastened directly to the grinding-wheel guard, the stop prevents the wheel from cutting below the desired level, and also causes the welds to be ground to the contour of that of the adjacent rail surface. To insure complete accuracy in the operation of the stop, it is reset at frequent intervals, that is, at about every third or fourth joint. It has been found on the Lackawanna that the automatic stop not only assures accuracy in the surface grinding operation, but also that it materially speeds up this operation by removing from the mind of the operator any question as to the depth of the cut to be made. In building up battered rail ends, the Lackawanna uses the strip method, and when such welds are surface ground with the aid of the automatic stop, it is difficult to distinguish them from full-ball welds.

Another feature of the surface grinders used by the on-track welding gangs of the Lackawanna is the fact that in each of them the carburetor air intake, fitted with a filter, is placed at the top of a vertical pipe, about five feet high, the purpose being to preclude the possibility of particles of metal from the grinding operation getting into and damaging the engine.

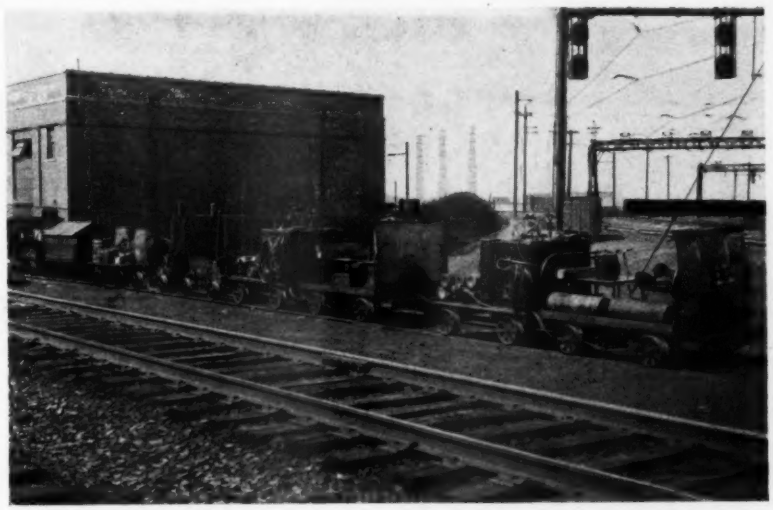
Following behind the two surface grinders in the welding gang is a Railway Track-Work P-11 double-head cross grinder with one operator who cross grinds the joints in both rails. To provide light for this operation, the operator carries a kerosene lantern with a reflector which he places on a convenient tie while he is operating the cross grinder.

Other Personnel

Aside from the personnel mentioned above, namely, four welders, two surface grinder operators and two helpers, and one cross-grinder operator, the gang organization includes a foreman, two laborers who change out insulated joints, paint the angle bars with oil and perform such other duties as may be necessary, and one or two flagmen, depending on whether the track being worked carries traffic in one or both directions. Other equipment includes a push car carrying a tool box and containing space for receiving the cross grinder when the outfit is being moved to or from the job, and another push car carrying fuel for the grinder engines, oil for the joint bars, a fire bucket and other items.

When moving the outfit to or from the site of the work, the various units comprising it are coupled together and are drawn by two motor cars, one at each end, which have automobile head lamps. One of these motor cars is coupled to the head-end push car carrying gas cylinders, and during cold weather its exhaust is used to heat the interior of the box on that car containing the acetylene cylinders. During such weather the equipment includes a third motor car which is used to heat the acetylene cylinders on the other push car.

At the end of the night's work, the welding outfit is moved to a convenient siding where it is serviced during the day by one man and a helper. These men change the gas cylinders, refuel and lubricate the motor cars and grinders and perform such other work as may be necessary to get the outfit ready for the next night's work. These men also go over the section of track that is to be welded the next night, numbering and marking the joints for welding and occasionally marking on a tie a figure representing the total lengths of the welds marked up to that point, these figures being for the use of the foreman and the welders in keeping a record of the night's output.



The Welding Outfit Is Placed on a Convenient Side Track During the Day

A Mile of Track a Night

It has been the experience of the Lackawanna that the welders can work as efficiently at night as during the daytime. On the average, the outfit described above will weld about a mile of track each night, the hours of work being from 8 p.m. to 5 a.m., with a half hour off for lunch at midnight. The practice on this road is to build up rail ends when the batter has attained a depth of 0.025 in. to 0.030 in.

The night welding organization described above was developed under the general direction of G. A. Phillips, chief engineer, and A. A. Johnson, engineer maintenance of way of the Lackawanna, and under the direct supervision of Paul E. Lowe, then roadmaster, and now general roadmaster, co-operating with representatives of the Oxweld Railroad Service Company. The night welding work is under the direct supervision of E. T. Lederman, roadmaster at Hoboken.

Some Roads Report Better Work and Others Considerable Savings from the Use of Spot Tampers

Should Power Tools Be Assigned to Section Gangs?*

OUR country is now in the midst of the greatest war of its history. With the demand for men for the armed services taking precedence over all other requirements, the manpower available for maintenance forces is diminishing at an ever-increasing rate, and we are frequently warned that this situation will prevail for some time. Hence, more work must be performed with less men, and for this reason mechanical labor-saving devices of demonstrated merit must be considered for every maintenance task. Each machine should be used with increased intensity, and lost operating time must be reduced.

More Work and Responsibility

Such factors as the decrease in available labor, war demands on equipment, and heavier traffic are placing additional responsibility and more work on section crews. To augment the amount of work done by such gangs, it is important that consideration be given to the matter of assigning labor-saving devices to them wherever practical. It is apparent from a recent survey covering a number of important roads that the equipping of regular section gangs with power tools has not progressed to any considerable extent because of the necessarily high investment in such devices and the difficulty of obtaining a sufficient number of days' work during the year from each tool to justify its purchase. Mechanical devices have, therefore, been assigned generally to extra or specialized gangs.

The information received, however, indicates that there is a definite trend on some roads in the direction of assigning certain mechanical tools to regular section crews, the extent to which this is done on individaul roads being dependent on the amount and character of the work required of the gangs. The following labor-saving devices have been assigned to section crews by the roads reporting:

1. Spot tampers
   (a) Unit-type—gas-driven
   (b) Pneumatic—two and four-tool outfits
   (c) Electric—two and four-tool outfits
2. Track liners
3. Small power mowing machines
4. Pressure oil spray cans for oiling track fastenings in track and in stock.
5. Rail pullers
6. Oxy-acetylene outfits—terminals
7. Power drills—terminals
8. Tie spacers
9. Tie nippers
10. Tie saws
11. Tie Pullers

Where the assignment of certain machines to a single section is not justified, some roads have assigned units for use on two or more sections. Small inexpensive labor-saving devices, such as track liners, tie spacers and oil spray cans, have been used quite universally by the roads reporting. It is only recently that the mechanical unit tamper, the small two and four-tool off-track pneumatic and electric units, and the small power mower have been employed by section crews to an appreciable extent. There is an indication that as different machines are tested on various roads and found satisfactory, additional units are being purchased and assigned to section crews if they have sufficient work to justify this policy. Tie spacers, nippers, saws and other tools have been used with satisfactory results on some roads. Available information does not indicate, however, that these tools have been assigned to section crews to any great extent.

Only a few roads have made time studies showing the savings to be effected by the use of the devices mentioned here. Most of the roads reporting state that when the purchase of a new machine is under consideration, experiments are conducted with one or two of the units, and if favorable reports on labor savings are received from the supervisors, additional machines are purchased and assigned as the finances of the company will permit and as maintenance requirements dictate. The savings indicated for various types of machines may be summarized as follows:

Spot tampers.—Some roads report that these units effect no marked savings in the cost per unit of work but that the quality of the work is such that it will last twice as long and make possible a longer period between general surfacings. Other roads report that each tamper unit will save from $300 to $600 per year in labor, these larger savings, of course, being realized by more intensive use of the equipment.

Track liners.—These inexpensive units make possible a reduction of about 50 per cent in the number of men required to do a lining job.

Small power-operated mowing machines.—These do as much work as 6 to 12 men with hand scythes.

Pressure oil spray cans.—One man can oil 500 to 600 joints per day, as compared with about 100 per day with brushes.

No reliable information is available regarding the savings in labor that are possible with the other types of tools mentioned above.

Depending on the nature and extent of the work to be done, there is considerable variation in the sizes of the different crews to which a given labor-saving device may be assigned. Some roads are using four-tool tamping outfits in gangs of five and six

* From a report prepared by a subcommittee of the Committee on Economics of Railway Labor of the American Railway Engineering Association. F. J. Bishop, engineer maintenance of way, Toledo Terminal Railroad, was the chairman of the subcommittee.

men. Others are using these units with gangs of ten men. Small power mowing machines, oil spray cans and rail pullers are usually moved over several sections. Track liners have proved economical when used in two and three-man gangs. In larger gangs one liner is usually assigned each two men. Other tools are assigned as conditions of the work require.

Conclusions

Many labor-saving devices will effect economies that justify their assignment to section crews, and the present labor shortage has enhanced the importance of giving serious consideration to the possibilities in the use of these devices by such gangs. The intensive use of such devices will yield large savings in labor.

Boys Fill Trackmen's Shoes

(Continued from page 507)

squarely to the foremen in charge, who are supported in all of their activities by the roadmaster and other division officers. When first employed, and daily thereafter, the boys are instructed in safe practices and are cautioned against unsafe practices. Following the "rule a day" practice in its broadest sense, the boys are given a short safety talk each morning before starting work, with emphasis upon details of conduct in the specific operations of the day. Supplementing this, the coaches or other school representatives accompanying the larger gangs are on the alert constantly to detect and caution against unsafe practices, and the roadmasters of the different territories, in company with the district safety engineers, make periodic visits to the boy gangs to discuss safety with them.

On the La Crosse-River division, for example, the safety engineer makes it a practice to visit each of the section gangs employing boys at least once each month, and the larger boy gangs as frequently as once a week. Special attention is given to the large group of boys working in the camps. In the case of the camp on the second-track project, the district safety engineer has not only assembled the boys for detailed discussions on safety once each week, but has spent full days with them on the track, instructing them in safe methods and cautioning them against unsafe practices. Fundamental among the safety instructions given to the boys is that safety comes first, that they must obey their foreman, that they must not run on or about the track, that undue haste in any operation is unsafe, and that they must not overtax themselves.

With the last mentioned consideration in mind, the boys are assigned to operations according to their physical fitness, and are shifted from task to task at intervals throughout the day to avoid monotony or over-fatigue. In addition, some tasks are purposely lightened in deference to the more limited physical strength of the boys. For example, on the new second-track project, four boys, working with two carrying hooks, were employed to carry and place the new 7-in. by 9-in. treated ties. Similarly, in the track lining work, 13 or 14 boys, with bars, were employed, whereas similar work might have been assigned to 9 or 10 regular section men.

In spot tie renewal work, where regular section men are employed along with the boys, the section men generally pull the old ties out of the track and insert the new ties, leaving to the boys the pulling of the spikes; the cribbing out of the ballast between ties, the tamping up of the new ties, such nipping for the section-men spikers as may be necessary, and final redressing of the ballast section. While there are exceptions to the rule in the case of some of the huskier boys, practically all machine operations are assigned to men of the regular track forces. An outstanding exception to this rule is in the operation of electric tie tampers, which are being operated by the boys on all large surfacing jobs.

That the various safety measures and precautions adopted have been effective in preventing personal injuries to the boys, is seen in the fact that, in proportion to their number, reportable injuries have been fewer among the boys than among the older track men, and that not a single reportable injury has been sustained by any of the boys working on the nine-mile second-track job.

Throughout the remainder of the summer, the boys on the Milwaukee will be employed primarily in routine maintenance operations as needed, including a number of large out-of-face surfacing projects. Already, plans are set up to move the large second-track boys' camp to a large general main-track surfacing program between Red Wing and Lake City, Minn. In this work, as in the new second-track work, the camp will be moved from point to point as the work progresses, and each camp site will be selected with the view to offering boys a field area to play in evenings and, if possible, a nearby place to swim.

The large-scale plan of employing teen-age boys in track work on the Milwaukee was conceived and has been encouraged by J. T. Gillick, chief operating officer of the road, and is being carried out under the general direction of Wm. G. Powrie, engineer maintenance of way. The actual employment and supervision of the boys is under the immediate direction of the superintendents, division engineers and roadmasters on each of the various divisions.

Conserves Steel by Copping Rail in Track

(Continued from page 510)

after the surfacing gang makes the main lift, the track is given a final running surface and is tamped with air tampers, using an eight-tool 120-cu. ft. Model KRC 8 Ingersoll-Rand Crawl-Air compressor, which is powered with a Diesel motor. At the time the track is surfaced, new ties are inserted as required, the joint ties are spaced properly at the joints and the intervening ties are respaced as needed. In some instances, if conditions warrant, the track is given only a light surface on new chatt ballast, instead of a heavier raise out-of-face on rock ballast.

After the surfacing and final tamping on rock ballast, additional rock ballast is unloaded to dress the track to a standard 14-ft. ballast section. In addition, the subgrade is brought up to a standard width of 20 ft. and to a height of not less than 12 in. below the bottom of the tie and is dressed with about a 3-in. fall from the toe of the ballast to the embankment shoulder. At the same time, ditches are cleaned and dressed to a standard section.

The Southern has been so well pleased with this work, started in 1942, that it has continued the program on this line in 1943 and has started other cropping gangs on the Central and Eastern lines. The work on the St. Louis line is being done under the general supervision of A. A. Woods, chief engineer, maintenance of way and structures of the Western lines, Cincinnati, Ohio, and under the immediate supervision of C. E. Price, roadmaster, Louisville, Ky., and C. W. Russell, assistant roadmaster, Centralia, Ill. V. W. Oswalt, supervisor of work equipment, Western lines, Cincinnati, is responsible for the care and repair of the work equipment used.

What's the ANSWER?

Shortened Life of Dry Cells

In what ways is the service life of dry cells shortened through misuse? How should they be handled?

Many Forms of Misuse

By C. L. Fero
Supervisor of Work Equipment, Boston & Maine, Boston, Mass.

The service life of dry cells can be shortened considerably through any or all of the following forms of misuse: (1) mal-adjustment of coil vibrators; (2) short circuits in engine or timer wiring; (3) improper or loose battery connections; (4) short circuit from bottom of battery to the frame of the car, through bolts that hold the battery box in shape; (5) broken seal of battery case, by denting or jamming the battery; and (6) water or moisture in the battery box. Battery boxes should be weatherproof, and the batteries should be tested frequently to insure that there are no dead cells.

To prolong the life of dry cells, particularly on motor cars, the vibrator points should be adjusted with a meter. The wiring should be inspected frequently and any worn or defective wires should be replaced. Jumpers or connectors between batteries should be kept tight, and care should be taken to insure that batteries are insulated effectively from bolts, and they should be so packed in the boxes that they will not rattle around and cause the insulation to become worn.

Lists Many Ways

By C. R. Knowles
Superintendent Water Service (Retired) Illinois Central, Chicago

There are many ways in which the life of dry cells is shortened through abuse and misuse. It is not uncommon for dry cells to be drawn from the store room in excess of immediate requirements, with the result that some of them are allowed to lie around in drawers and on work benches or in the tool trays of motor cars, together with other material, often exposed to the weather. Invariably they are badly deteriorated or wholly unfit for use before they are put into service. Extra dry cells should never be kept on hand longer than necessary, for they deteriorate almost as rapidly when idle as when in use.

Although it may not be generally realized, a dry cell is properly classified as perishable. No one would think of storing potatoes near a radiator, yet a dry cell will deteriorate almost as quickly as the potatoes when exposed to excessive heat. They should be stored in a dry, cool place, remote from radiators or steam pipes. On the other hand, they should not be exposed to freezing temperatures, for a frozen cell will be inoperative, although it will again become operative when it thaws out. They should not be piled promiscuously in bins, boxes or barrels, because if the terminals come into contact with each other, the cells will drain quickly. They should not be stored on their side or with the terminals down, but in every case they should stand upright. They should be stored in quantities limited to actual requirements because they deteriorate rapidly when not in use. They should be used in the order in which they are received, to avoid excessive time in storage.

Motor-car operators and others using dry cells for ignition should remember that every dry-cell battery requires the same care as the spark-plug coil and spark plug, and that it is as essential to the operation of the car as the engine. Old, weak cells

Send your answers to any of the questions to the What's the Answer Editor. He will welcome also any questions you wish to have discussed.

To Be Answered in September

1. Where rail is to be renewed, what incidental work, other than surfacing and tie renewals, will aid in extending its service life? When should this work be done?

2. How should bridge and building men be taught safety practices? Who should instruct them? What special attention, if any, should be given to new men?

3. What practical means can be employed to conserve ice shipped to section, extra and bridge and building gangs?

4. In view of the present difficulty of getting stress grades of timber, is it now desirable to renew ballast decks on bridges? Why? What other considerations are involved?

5. What precautions in the operation and maintenance of air compressors will reduce the necessity for repairs and increase the service life of the equipment? Who should be responsible?

6. Since oakum and jute are becoming scarce, what satisfactory substitute can be employed for making lead joints in bell and spigot pipe? How can lead be conserved?

7. Where a bolt tightener is used when laying rail, should the bolts be retightened? After what interval? How many times? Why? What tensions should be employed?

8. What are the most common errors in the application of paint? What are the effects? How can they be overcome?

should not be used with fresh cells, for the life of the battery will be no longer than that of the weakest cell. Some motor-car operators, and some others as well, have the mistaken idea that seven or eight dry cells are necessary to provide an effective spark. Four dry cells are enough for a motor-car battery, and the spark will be just as effective as one from eight cells. This will give more than double the life of the eight-cell battery when connected in series.

Care should be used when testing dry cells, for many have been ruined through the practice of short circuiting them with a knife or screw driver. When using an ammeter or other device to determine the strength of the battery, contact should be for only a second or so; otherwise the battery may be bled to death. The short-circuit method of testing the battery causes too heavy a drain to permit its extensive use. Care of dry cells in any service will be followed by longer life and better results, and will conserve materials vital to the war effort.

Gives Reasons for Care

By Paul L. Zepp
Transitman, Baltimore & Ohio, Punxsutawney, Pa.

A dry cell consists primarily of a carbon rod, the positive terminal, and a zinc can, the negative terminal. The intervening space is filled with an electrolyte. The electrolyte is a moist mixture of crushed carbon, graphite, manganese dioxide, zinc chloride and ammonium chloride. The functioning of the dry cell depends on this mixture being kept moist, for which reason it is sealed at the top by a wax or asphaltic mixture. If this seal is broken by rough handling, the life of the cell will be limited. Likewise, if the cell is kept in a hot, dry place, the moisture in the cell will escape more quickly, and again its life will be limited.

When the circuit is closed through a dry cell, ammonium and hydrogen are liberated by the chemical action between the ammonium chloride and the zinc. The ammonium is oxidized slowly by the manganese dioxide, but when the circuit is closed for a long period, the hydrogen is liberated faster than it can be oxidized, and the cell becomes polarized. If the cell is allowed to rest, this oxidation will continue to completion and the voltage will again rise. It is for this reason that the cell functions at its maximum efficiency only when it is used intermittently. When it is used for ignition in the starting of gasoline motors, which run on magnetos after they are once started, it is being used for a purpose for which it was designed. If it is used in a service that demands a continuously closed circuit, the cell will become exhausted quickly. Where a cell is used in a flashlight, it should be used only intermittently and for short periods.

When tested with an ammeter, a new dry cell should give a reading between 20 and 30 amperes. This method of testing has its dangers, however, for if used often, or if the testing time is prolonged, it will cause unnecessary shortening of the life of the cell. This is brought about by the fact that an ammeter has practically no internal resistance, and the use of this instrument for testing amounts practically to short circuiting the dry cell.

When one dry cell in a series becomes weak, it should be removed, since it creates a resistance that the remaining cells must overcome, and this resistance will reduce their strength to the level of the weak one. The life of an exhausted dry cell can be rejuvinated temporarily by drilling small holes through the zinc shell and immersing the cell in a salt solution. This is rarely practical, however, because in most cases the utility of a dry cell depends upon its portability.

Laying Old Rail on Curves

Is there any objection to cropping rail released from tangents and relaying it on curves of 4 deg. or sharper? Why? Does the age of the rail, the density of traffic or the speed of trains make any difference?

Age Makes No Difference

By A. E. Perlman
Chief Engineer, Denver & Rio Grande Western, Denver, Colo.

I have long believed that if it were economically possible to put new rail in tangents for five years before installing it in curves, the cold rolling and hardening of the running surface would greatly extend its life on curves. However, when it comes to cropping rail released from tangents and relaying it on curves of four degrees or sharper, other factors must be considered; among which are (a) the determination whether the rails will last long enough on the curves to pay for cropping; (b) the increased number of joints, by reason of cropping; where joint wear is particularly severe, especially on the low rail; and (c) the further fact that ordinarily, rails from tangents, on which the joints are battered enough to require cropping, will also be surface bent and probably be so head worn and uneven in surface as to make it unprofitable to use them in curves on lines carrying heavy traffic.

Considering these factors, I do not believe that it is economical to crop the ends of the rail for use on lines of heavy traffic, where the maintenance on the curves is difficult at best. However, such practice may be economical for branch lines and primary lines of light traffic.

The age of the rail makes no difference; it is the condition of the rail that is important. Speed is also important, because then the section must be considered, as well as the problems of joint and track maintenance. Again, the number of service and detected failures in the heats while in the tangent must be taken into consideration.

Avoid Cropping

By C. B. Bronson
Inspecting Engineer, New York Central System, New York

Owing to the present difficulty of obtaining new rail, and to the shortage of relayer rail, it is of prime importance in the present emergency to avoid the cropping of rail, if it is possible to do so, using such means as building up the rail ends after the rail is laid, and the application of new joint bars to compensate for the wear on the fishing area. Assuming, however, that all means have been exhausted to preserve the rail in its full length, and that cropping must be resorted to, then the question of subsequent service arises.

The condition of the rail released from tangents is the governing consideration in determining the desirability of relaying it on curves of four degrees or sharper. If the top wear is not excessive, and if the gage or

outside corner shows only a small amount of flow or distortion, the contour of the rail head will be satisfactory for use on the curves. On our railway, we have relaid any cropped rail which we have had in freight tracks, in minor lines or in branches, depending on the weight of the rail. Even before cropping, however, it is important to weed out all rails in heats having bad records with respect to failures from fissures, split heads, etc., and those containing driving-wheel burns. In other words, after cropping, the rail should be suitable relayer rail in all respects.

The age or the date of rolling makes no difference, provided its previous service is good from the standpoint of failures, and also provided that the head is not worn or distorted unduly. It is not the age of the rail that counts; the volume of traffic it has carried is the governing factor. If the rail has already carried a heavy traffic, particularly if at high speed, and has rendered a good account of itself, this should give added confidence in its value for further service. With such a record, the rail should be suitable to handle heavy traffic at operating speeds. In our case, we do not install cropped rail in high-speed tracks, because it is our policy to lay new rail in these more important tracks. There are many other places, however, where the rail thus released can be used to advantage in less important or lower-speed lines, where it should have a reasonably long life. Speed on the curves should, obviously, be restricted to conform with operating requirements, but this applies to new rail also.

They Will Last Longer

By W. H. Sparks
General Inspector of Track, Chesapeake & Ohio, Russell, Ky.

Age, of itself, has nothing to do with the determination whether a rail is suitable for further use, or with the use for which it is suitable. On the other hand, the amount of the traffic carried and the length of time the rail has been in service determine the amount of wear that the rail has sustained, and thus become deciding factors whether the rail is suitable for further service and the character of that service. The speed at which trains are operated, coupled with the volume of traffic, determine the wear on the joints, including both end batter of the rails and wear on the fishing surfaces.

Rail that is not badly worn can be released from a tangent and relaid in a curve, where it should give better service than a new rail, since it has had the advantage of cold rolling under traffic. If the ends are battered, with only moderate wear on the fishing surfaces, it can be reconditioned by welding and the application of oversize bars, thus avoiding the necessity for cropping. If the fishing surfaces are badly worn, the rails should be cropped.

Restrictions on Linseed Oil

What effects do the present restrictions on the use of linseed oil have on the quality of paints? On their performance? On their service life?

No Substitutes

By V. E. Engman
Chief Carpenter, Chicago, Milwaukee, St. Paul & Pacific, Savanna, Ill.

No substitute for linseed oil as a vehicle for paint has yet been developed, that is comparable in cost, or that has the same durability with respect to resisting the elements. There are many synthetic substitutes that are being used as vehicles for paint and, although they do not have the same lasting qualities as linseed oil, they do offer needed protection for surfaces for a shorter time, and they answer the purpose, so far as appearance is concerned. This means that, for the duration of the war, or until the present restrictions are relaxed, while linseed oil is not available in needed quantities for paint, we will use some of these substitutes and paint oftener.

Should Not Deteriorate

By G. S. Crites
Division Engineer, Baltimore & Ohio, Baltimore, Md.

The original limitation order, M-71, called for a 30 per cent reduction for the paint industry. This has been reissued as FDO 42, restricting the paint industry to 50 per cent of the consumption of linseed oil during 1940 and 1941, averaged by quarters. No carry over after June 30, 1943, will be permitted.

Linseed oil, crushed for all uses in 1940, amounted to 606,454,000 lb. In 1941 this was increased to 852,000,000 lb. During 1940 the paint industry consumed 270,235,000 lb., and in 1941, the consumption was 373,745,000 lb. The United States produced 51,460,000 bu. of flax seed available for crushing in 1942 and it is estimated that we will raise 56,800,000 bu. this year. We will also import from Canada and Argentina about one-fourth as much flax seed as we raise ourselves. There should, therefore, be sufficient linseed oil for paints for the immediate future, so that there should be no sudden rush to use unproven substitutes.

The so-called "linseed oil replacement" calls for 1/3 raw linseed oil, 1/3 bodied linseed oil and 1/3 volatile thinner, by weight. For brush applications made of paint mixed in accordance with this formula, little or no thinner should be added. For spray applications, only enough thinner should be added to provide satisfactory atomization of the paint.

If we do not get panicky and go to substitutes for linseed-oil paints before these substitutes have been proven, but go ahead and apply what linseed-oil paints are available, and do this in accordance with correct procedure, there should be little or no deterioration in the performance or service life of such paints as we apply.

Need Not Affect Quality

By General Inspector of Buildings

Like many other things that we have been inclined to take for granted, paint is feeling the pinch of wartime restrictions, largely because of a shortage of ships to maintain our imports. Originally, there was an increased demand for linseed oil as a result of the supply of China and other drying oils having been shut off by the war in Asia. Then the supply of flaxseed decreased sharply, after we entered the war, most of which was imported from Argentina.

To assist consumers to make the available supply of linseed oil go as far as possible, the Bureau of Standards issued a circular which was, in effect, a supplement to the original WPB Limitation Order M-71, entitled "Conservation of Linseed Oil in Paint." This pamphlet describes ways in which the manufacturer can reduce his consumption of linseed oil by revising his formulas; and contains suggestions to consumers with respect to thinning paste white lead and both dry and paste red lead, for

use on highly absorbent outside surfaces and on non-absorbent surfaces. All of the formulas given in the circular provide for a marked reduction in the amount of linseed oil in the paint, thus raising the ratio of lead to oil.

As large users of lead paints, probably the first question to arise in the minds of maintenance officers will be the effect of this reduction in the oil content of the paint on its wearing qualities. He will also want to know about its appearance and what the difficulties of application may be. Obviously, only time will give the final determination of the first question; yet there is no reason to believe that the suggested reduction in oil will have any detrimental effect on the wearing qualities of the paint. In fact, I know paint foremen who have advocated a reduction in the volume of linseed oil in paint, except in the priming coat, on the ground that this will improve the quality and observation is that their work has stood up as well as that of the foremen who have been in the habit of using the conventional amount of oil.

So far as appearance is concerned, the reduction in oil will improve the hiding power of the paint, since the pigment is the opaque element, and there is relatively more pigment in the revised formulas. Furthermore, the paint should dry faster than one that is rich in oil, so that there will be less opportunity for staining by dirt and dust during the drying period, and it will retain its good appearance longer. Ease of application is provided in the formulas by the inclusion of a relatively high content of turpentine. These formulas were prepared for brush painting, so that if the paint is to be applied by spraying, it may be necessary to increase the amount of thinner to insure satisfactory atomization.

Draining the Roadbed Now

To what extent is it desirable to undertake track drainage and roadbed stabilization work under present conditions? What are the advantages? The disadvantages?

The Same as Always

By H. R. Clarke
Chief Engineer, Chicago, Burlington & Quincy, Chicago

The desirability of undertaking track drainage and roadbed stabilization work is practically the same as it has always been, except that it is increased somewhat under present conditions. The principal advantages are the decreased labor and material required to maintain track, the removal of speed restrictions and elimination of the hazard of sudden subsidence or distortion of the roadbed. All of these are of more importance at present than they were formerly. Track labor is extremely limited and anything that can be done to decrease the volume of necessary work is desirable. Traffic is heavier; therefore, any interference with the free movement of trains is more harmful and accidents are more to be avoided at present than they have ever been.

The only disadvantage is the difficulty of securing the labor and material for the stabilization work. Yet, since the amount of labor involved in the stabilization of a given piece of roadbed is usually so small, compared with the labor saved by doing the work, this is scarcely a consideration. If the proper information is furnished and argument made, the necessary material can generally be obtained and, in some cases, less critical materials can be substituted for others that are rated as more critical. Summed up, I believe that present conditions justify an increase in the amount of this kind of work.

Results Are Profitable

By D. L. Britton
Assistant Supervisor, New York Central, Monroe, Mich.

A reasonable amount of stress should be placed on any program that gives promise of profitable results. It is just as essential to undertake drainage and roadbed stabilization projects under present conditions as when conditions are normal. It may be trite to say that if nothing is undertaken, nothing will be accomplished; yet this is particularly true of drainage, and it requires very little effort to undertake progressive work of this character. It can be much more costly not to undertake than to undertake such work, because no one knows how long present conditions are going to endure. The profitable and satisfactory results obtained from drainage and other forms of stabilization far more than offset the cost and effort to accomplish it. There are a few minor disadvantages, mainly involving the difficulties incident to securing repairs for machines employed in the work, and obtaining suitable equipment, materials and labor, but the advantages are so great as to overshadow them.

A "First" Requisite

By G. S. Crites
Division Engineer, Baltimore & Ohio, Baltimore, Md.

There never was a time in railway history when it was more necessary to do the immediate "first" things first, than at present. Drainage is always a prerequisite for safe track, and conditions have not changed as a result of the war. As a rule, track drainage does not call for highly skilled trackmen. In many cases, older men with wheelbarrows; women with small handbarrows; boys with a small one-horse scraper, or unskilled laborers with suitable tools, can keep ditches clean and allow water to run away from the tracks. Keeping vegetation from the roadbed and ditches aids drainage. Where women are available they can do this class of work well.

Machines, such as graders and spreaders, ballast-cleaning machines, ditchers, cranes with grab buckets and crawler cranes with buckets, should be used to the fullest possible extent. Such machines call for the minimum amount of labor.

Roadbed stabilization has many ramifications, since no two places call for exactly the same treatment. The best thing in most cases is to intercept water before it reaches the roadbed, if this is possible, and to get as much water out of bad places as can be done readily. Studies should be made of each case and the remedies should be applied as soon as possible. For many reasons, it is not always possible to do this immediately. Intricate jobs of roadbed stabilization are better left to specialists, provided they are available when needed.

Must Not Neglect

By W. H. Sparks
General Inspector of Track, Chesapeake & Ohio, Russell, Ky.

This question refers to two exceedingly important factors in the maintenance of safe roadbed, for if either is neglected, damage and hazard will result. Under the conditions imposed by the war, that is, an exceedingly dense traffic and a marked increase

in the average speed of trains, it has become still more important that the roadbed be well drained and stable. Every person who knows even the elementary principles of track maintenance is aware of the need for a dry, solid roadbed, for without such a foundation, line, surface and gage cannot be maintained, and speed must be sacrificed to safety. But any marked reduction in speed will affect the road's ability to handle traffic about in direct ratio to the reduction in average speed of the trains affected.

There is nothing extravagant in the application of drainage, with respect to either labor or material. In fact, drainage projects use the minimum of critical materials, and a relatively small amount of labor. I do not know of any disadvantage in prosecuting either ordinary drainage work or roadbed stabilization, while the advantages are so obvious that there is no need to mention them beyond what has already been said.

Returning Empty Drums

What measures should be taken to insure the return of empty oil and chemical drums? Why? How should they be prepared? How handled?

Learn Supplier's Wishes

By J. H. Davidson
Water Engineer, Missouri-Kansas-Texas, Parsons, Kan.

To insure continued delivery of essential chemicals and allied products, it is important that all returnable containers be sent back to the suppliers as promptly and in as good condition as possible. It must also be kept in mind that many suppliers are now calling for the return of steel drums that were formerly non-returnable, as well as for the return of fibre drums, slack-wood barrels, tight-wood barrels and cylinders. For this reason, each user should ascertain from his dealer whether he desires the containers returned, before other disposition is made of them. Containers should not be used by the purchaser of the chemical for other purposes without the specific permission of the supplier.

Damaged steel drums can usually be repaired with profit by welding. All drums should, therefore, be inspected systematically and not discarded because of minor damage. Probably the most satisfactory method of handling empty drums is to have them sent to some central store room where they can be inspected, tested, repaired and assembled for shipping. The following suggestions for the handling of these drums were made in a recent bulletin from the Chemical Container division of the War Production Board:

1. Do not apply pressure to empty the drums.
2. Drums should be kept clean, but do not rinse them.
3. Do not use drums for the storage or shipment of any other material.
4. When returning drums, replace and tighten both bungs securely.
5. When returning open-head drums, do not interchange lids or lever locks. Be sure that the lock is returned with the drum.
6. Use the correct size of valves to prevent stripping of threads.
7. Do not tighten bungs excessively, as this may rupture flange threads or loosen the spud, which will ruin the drum.
8. Use a faucet or spigot provided with threads equipped with resilient gaskets. Faucets equipped with tapered threads may turn the spud in the drum, thereby causing leaks, with the possibility of ruining the drum.
9. If possible, store drums under cover to prevent rusting.

Is a War Casualty

By C. R. Knowles
Superintendent of Water Service (Retired), Illinois Central, Chicago

Steel drums are used by the maintenance of way department for handling both oils and chemicals, but this department is concerned principally with the drums used for shipping chemicals employed in the treatment of water, as most of the oil drums are handled by the stores department, while water-treating chemicals are generally shipped directly to the point of use. It has long been the practice for the shipper to bill the cost of oil drums to the consumer at the time of shipment and then give credit for them when returned. Drums for the shipment of water-treating chemicals are constructed of lighter steel than oil drums and, prior to the issuance of War Production Board Limitation Order L-197, the cost of chemical drums was included in the price of the treating chemicals, and they were not returnable. The war, and the WPB order have changed this, however, and the chemical drum now has the same status as the oil drum, except that a slightly lower value is placed on it. Order L-197 prohibits the use of steel drums for the shipment of dry chemicals, but permits them to be used for liquids, with strict limitations. They may be used for the shipment of liquid treatment, provided they were on hand and had been used for this purpose prior to September 14, 1942, but the order prohibits the purchase of either new or used drums after that date.

Oil drums are not only constructed of heavier material than those used for chemicals, but they differ in design, many of them being welded, with small threaded openings for emptying and refilling, while many of the chemical drums have removable heads. These heads are held in place by a locking ring and are sealed against leakage with a rubber or composition gasket. Under present conditions it is not solely a question of cost, but of absolute necessity that these drums be returned, since no more will be available for the shipment of water-treating chemicals for the duration of the war. It is a question whether the drums now on hand are sufficient to meet requirements, but it is a certainty that, unless they are handled properly and returned promptly, in a short time there will not be enough to go around.

Extreme care should be exercised when handling drums, since they are easily damaged. They should always be rolled out of cars or trucks, never dropped. The weight of a standard drum with a capacity of 52 gal. ranges from 500 to 650 lb. when filled with chemicals, while the weight of the empty drums ranges from 50 to 65 lb. They should not be used for any material other than that which they contained originally. They should not be used for the storage of used or reclaimed waste or other material, or as water barrels on bridges or other structures, for wooden barrels will serve as well. Furthermore, the use of the drums for any kind of storage is prohibited by the order.

When drums having the locking ring are emptied, the gasket should be placed inside the drum and the cover or head should be fastened in place with the locking ring before it is returned. Where plugs or caps are employed to close openings for drawing liquids from the drums, they should be screwed back into place. The return of the covers, rings, clamps, plugs and locks is quite as

important as the return of the drum itself. While no restrictions have been placed on the purchase of covers or other parts or accessories for drums, it is impossible to obtain them.

When handled and cared for carefully, the life of a steel drum is indefinite. But as the only drums now available are those that are now on hand, it will take close co-operation on the part of the shipper and the railway to make them last.

Using Off-Track Equipment

In what ways and to what extent do the density and importance of today's traffic give emphasis to the use of off-track equipment in bridge maintenance? What equipment? What are the advantages? The disadvantages?

Only a Few Types

By Supervisor of Bridges and Buildings

If a bridge maintenance job is of sufficient magnitude to require the time of a gang for a week or more, it may be that the use of off-track equipment will be of advantage in the prosecution of the work. If less than a week is required, it has been my experience that the cost and time involved in getting the machines to and away from the job are so great that there is no profit in attempting to use them, with one exception, this being when it will avoid the necessity for a work train for several days. Work trains are expensive when one is able to get full time out of them. Today they are unreasonably expensive, for at the best, considerable time is lost clearing trains, while at the worst, one may get only an hour or two of actual work on a busy main line.

In this discussion, I assume that the question refers to crawler mounted cranes, tractors and similar mobile equipment, for it is a general practice with us, and I assume it is also with other roads, to employ air compressors and generators, which, although they are rail mounted for ease of transportation, are set off the track while in use, and are employed as power plants for the operation of power-operated hand tools. We also use power hoists and winches, and recently have added one or two small derrick cars, all of which we find are advantageous. In addition, on some of our jobs we set up a revolving derrick. This can be assembled quickly, or moved easily to new locations as the work progresses, and is very handy for handling bridge timbers, unloading cars and other similar work.

It is not practicable, generally, to employ mobile machines of such size that they cannot be shipped directly to the site of the work or unloaded nearby, for bridge jobs are sometimes miles apart, and equipment on crawler mountings cannot be moved along the highways in some territories. In any event, most of our bridge maintenance work does not require machines of large capacity, and the smaller and more responsive types give better service.

Too Much Moving

By General Inspector of Bridges

This is a subject to which we have given considerable thought, for several reasons. In the first place, work-train service has become so expensive that we try to avoid the use of work trains wherever possible. In the second place, traffic is so heavy on most of our lines at present that a work train or an on-track machine must spend most of its time keeping in the clear of trains, so that we get very little use from either one. Again, one must hold a high priority to be able to get a locomotive or a train crew these days. In track maintenance the use of off-track equipment has become a general and successful practice for many operations, all of which have one characteristic in common—the volume of work is sufficient to justify moving the machines to the point of use and returning them when the job is finished.

We use air compressors and generators with off-track mountings as power plants for the power-operated tools, and we find them to be quite valuable. We have also used crawler-mounted cranes for heavy lifting on some of our jobs which required some time, and we have driven piles with them. In general, however, ordinary bridge maintenance jobs are relatively short, while they may occur at widely-separated points, and the time and effort involved in moving crawler-mounted equipment from one job to another does not justify its use, since these mountings are barred from the highways in many states. Furthermore, the condition of the ground around bridges generally does not lend itself to the use of wheeled equipment.

Ways to Conserve Nails

In what ways can nails be conserved? Are there any disadvantages?

Must Use Judgment

By A. G. Dorland
Assistant Engineer, Elgin, Joliet & Eastern, Joliet, Ill.

During the present crisis all material should be conserved to the fullest possible extent, this being especially true of steel products. On the other hand, a foreman must use judgment in determining whether it is better to waste critical labor to avoid wasting critical material. By careful supervision, a wide-awake foreman can see that his men do not waste their nails by dropping them into the dirt, or by unnecessarily bending or otherwise destroying them.

Old nails should be picked up and, if it is uneconomical to straighten them, they should be sent to the scrap pile. This will not only conserve the material, but is a safety measure, for many persons have been injured by rusty nails. Furthermore, an automobile may be driven where nails are lying around, and rubber is too critical to allow any avoidable punctures.

Requires Careful Handling

By Supervisor Bridges and Buildings

A single nail is not very important when compared with the numerous other items of material required in railway construction and maintenance. Yet in the aggregate they assume surprising importance, with respect to both volume and cost. As a matter of fact, our purchases of nails amount to between $40,000 and $50,000 a year, representing a million or more pounds of a critical material that is vital for our fighting forces. Assuming that 10d nails, running 69 to the pound, represents the average size, our road purchases more than

70,000,000 nails a year. This gives some idea of the opportunities for wasting this lowly but important item of material.

Like other items that have been easily available at low cost, seemingly from an inexhaustible supply, nails have usually received little attention from supervisory officers, most of whom have not appreciated the waste that has been occurring. Our forefathers who pioneered in the settlement of the frontier had a better appreciation of the value of a nail when they were forced to use wooden pins or hand-forged nails for assembling their buildings. Again, contractors, who must watch every avenue of waste that may affect their profits, have a better appreciation of the possibilities of wasting nails than the average foreman or supervisor in railway service, who is not concerned particularly with the profit motive.

Anyone who has handled nails is aware that they are easily dropped, especially the smaller sizes, and that unless particular care is exercised, ordinary operations will almost always result in considerable loss, and that the wearing of gloves or mittens increases the difficulty of retaining them. A contractor erecting one of our buildings told me recently that carpenters wearing gloves while at work waste about 25 per cent of the nails they handle, and that those wearing mittens lose as high as 50 per cent. He was careful to say, however, that these figures refer to nails in sizes 10d and smaller, since the percentage of loss for the larger nails is much less.

Another common form of abuse is to permit nails to accumulate in large quantities and allow them to become rusty, sometimes to the extent that they are unfit for use. Nails are also wasted by distributing them around the work in quantities greater than are required. Where this is done, it is difficult to remove them when the job is finished and they are allowed to go to waste. They should be kept in boxes or kegs, both in stock and on the job. In stock, a separate container should be provided for each kind and size of nails. Mixing nails of different kinds or sizes in the same receptacle not only wastes the labor required to pick out the sizes that are wanted, but it invites the use of the wrong sizes, usually resulting in a poor job and damage to the material in which they are used.

The cost of the individual nail is so small that there is no economy in salvaging it after it has been misplaced. For this reason, if any saving is to be made it must take the form of prevention of waste. It is apparent that a little care in the handling of nails will give a good return in time and money; but, more important than this, it will conserve a highly critical material. The accomplishment of this objective is a matter that requires education and supervision.

Expanding Weed Destruction

Are there any advantages in expanding weed-destruction programs under present conditions? Any disadvantages? Why?

A Distinct Advantage

By Edgar Bennett

Assistant Chief Engineer Maintenance of Way and Structures, Southern, Knoxville, Tenn.

There is a distinct advantage in expanding weed-destruction programs at this time for the reason that the free growth of vegetation and the consequent fouling of the ballast will hasten poor drainage, ballast cleaning and, in many cases, the general resurfacing of the track. In the South, where vegetation is heavy along most of the lines, it has been the practice, under our regular maintenance program, to provide weed killer for the control of the vegetation in the track section, and it is important that we keep up this part of the maintenance program; otherwise the advantage of previous applications will be lost.

A high standard of track maintenance is required to enable us to handle effectively the heavy traffic now moving over our lines, brought about by war requirements. This, together with the increasing shortage of competent track labor, which devotes most of its work to the track, makes it more important now to expand our weed-destruction program.

Both the density of traffic and the train speeds that are necessary to move this traffic are making demands on track that cannot be met if drainage is blocked and the ballast is allowed to became foul, for this will increase unreasonably the amount of labor that must be applied to maintain the track to the high standard that is necessary to keep this traffic moving without interference or delay. Furthermore, foul ballast must be cleaned and eventually removed much sooner than would have been necessary if it had been kept clean. This in turn calls for a general surfacing. All of these require additional labor at a time when labor is scarcer than most maintenance officers have ever seen it, and at a time when there is no prospect for improvement.

Likewise, it is important to keep the vegetation on the right of way, outside the limits of the ballast and roadbed, under control. Most of us passed through a period of neglected weed destruction on the right of way during the depths of the depression, and we are not likely to forget the lesson we learned at that time. Recovery was slow and costly; in fact, over many miles of our lines we will not be rid of the effects of this neglect for several years to come, for the continued seeding of noxious plants killed most of the grass we had built up into a clean sod over a long period of years, and it will take time and effort to restore it. Besides this, we caused the spread of many weeds to adjacent lands and in some cases, this built up considerable ill will on the part of adjacent property owners.

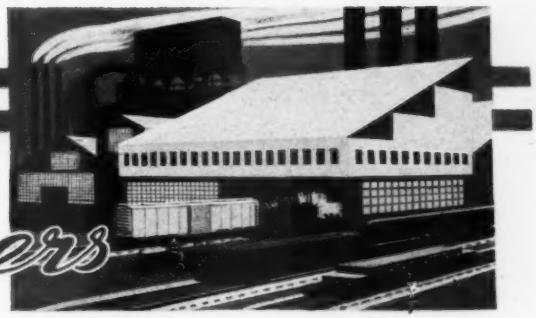
We are short of men for almost every operation in maintenance, and in view of this it might seem best to ignore the growth of vegetation in the track and roadbed and on the right of way. But experience has shown that when this has been done, the demands for labor on the track have risen out of proportion to the amount of labor involved in keeping the weeds under control. This indicates that, in addition to the other advantages of weed destruction, it actually conserves labor, when examined from the overall point of view.

Do Not Curtail

By District Engineer

Weed destruction has always been important but never more so than now. Those who have maintained dirt track when weed killers, weed burners and other effective devices for weed destruction were not available, will remember the amount of labor they devoted to keeping the track clear of vegetation. Certainly, they would not have applied so disproportionate an amount of labor to this purpose if it had not been important. It becomes still more important on ballasted track, for continued growth of vegetation soon fouls the ballast, increasing the cost of track maintenance unreasonably, making a high standard of maintenance impossible.

PRODUCTS of Manufacturers



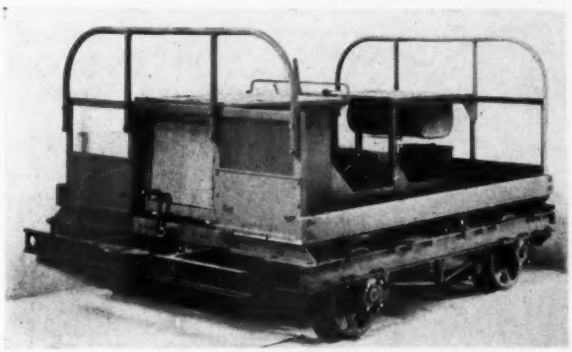
Fairmont Builds Multi-Gage Motor Cars

FAIRMONT Railway Motors, Inc., Fairmont, Minn., has developed a multi-gage gang motor car, a multi-gage one to four-man inspection motor car, and a multi-gage trailer for use on railroads with any track gage measuring from 30 in. to 66 in. Designed primarily for the Army, these cars can be used on practically any railroad throughout the world, and their construction is such that changing the wheel settings from one gage to another requires only 15 to 20 minutes.

Basically the same as the Fairmont three to eight-man Class A5, Series C gang car, the multi-gage gang car is powered by a 36-hp. Waukesha engine. The drive is through a dry disc clutch, four-speed heavy-duty transmission, double universal joint propellor shaft, and an enclosed reversable gear drive on the drive axle. Battery ignition is provided, and includes a generator with a voltage regulator. The car also has an electric strarter and an air cleaner.

The multi-gage one to four-man inspection motor car, on the other hand, is powered by the Fairmont 5-8 hp. reversible roller-bearing engine having water cooling and a condenser to conserve the water supply. Power is transmitted to the drive axle by an endless cord belt, and the use of a Timken tension control permits a free-running engine when not under load, and smooth, easy starting of the motor of the car.

To effect the multi-gage feature, both the gang car and the inspection car have a separate steel wheel support frame on each side, which carries both wheels and their housings, which, except for bolted connections, is independent of the main car frame.



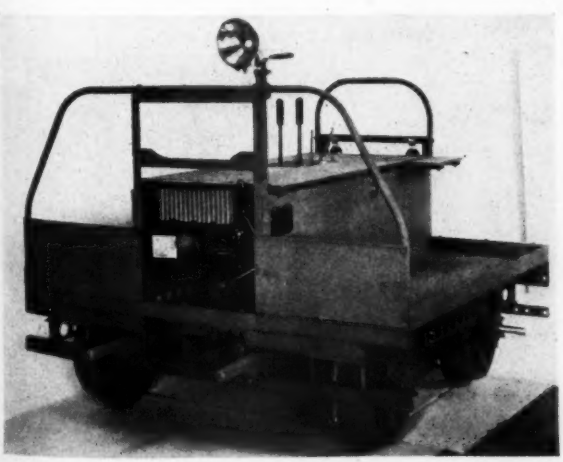
The Fairmont Multi-Gage Gang Car Is Powered by a 36 HP. Waukesha Engine

Each of the two wheels of each side unit is mounted on four single-row Timken bearings, two on each side of each wheel, which are housed in a dust-proof bearing casing. The brake shoes and outer brake linkage on each side are also supported by the opposite separate side frames. Since front and rear wheels are identical, the wheels and supports may be fitted to either side of the car.

In both models, no conventional full-length front axle is used. Instead, the wheels are supported by their bearings. The drive on the rear wheels is accomplished by the use of a splined drive axle and wheel hub having an internal spline. The brake shaft has a similar arrangement whereby the gage of the wheels can be changed without making any extra adjustments in the brake mechanism.

To permit the adaptation of the cars to various gages, the complete oposite side frames, with their wheels, can be slid laterally in guides built into the main car frame, and are held in place securely by four bolts at each end. Removing these bolts, shifting the units, and replacing the bolts are all that is required to change the gage. As an aid to conserving space when boxing either of the two types of cars for shipment, the safety rails, brake lever and the other parts that are above the seat, may be removed readily.

The new multi-gage trailer developed by Fairmont has a steel frame and wood deck, and employs the same wheel and wheel support arrangement that is used in the multi-gage gang car. Thus, the method of obtaining



The Fairmont Multi-Gage Inspection Car Has a 5-8 HP. Water-Cooled Engine

The Fairmont Multi-Gage Trailer

the various gage settings of the trailer is identical to that employed in the case of the gang car.

Buda Multi-Gage Track Motor Cars

DESIGNED specifically for the Military Railway Service, but adapted for use on railroads throughout the world, regardless of gage, the Buda Company, Harvey, Ill., designed and is now building two models of motor cars and a heavy-duty trailer car, each of which, with minor adjustments, can be adapted to operate on track gages ranging from 36 to 66 in. One of the motor cars, known as the Model R-1, is a heavy-duty, four-wheel-drive, extra-gang type car designed to carry 10 or 11 men with their tools, and to haul trailers carrying men, tools and materials. The other motor car, similar in many of its features to the company's 2 to 4-man F-2 "Roadmaster" inspection car, is designed primarily for patrol and inspection service.

The special feature of both new motor car models and the trailer is that, through individually mounted wheels and adjustable side frame rails and brake riggings, all of the units permit of ready adjustment to gages of 36 in., 39⅜ in., 42 in., 48 in., 56½ in. and 66 in., and, with appropriate drilling of the frame, can be adjusted to any other gage required.

The heavy-duty model car, equipped with a wood deck and seat, has a frame of rolled steel channels, welded together, except for bolted connections of the adjustable side rails. This car is powered by a water-cooled Buda gasoline engine of 54½ b.hp., the same unit that is used in the company's 12-man officers' inspection motor car, and has drive on all four wheels. Equipped with a single-plate clutch, a standard commercial transmission and a fully enclosed reverse gear, the car has five speeds forward and reverse. It has chain drive from the reverse gear to the rear axle, also to a jack shaft and thence to the front axle—with split sprockets of uniform size throughout to simplify repairs and to minimize repair parts stocks.

The variable gage feature of the car is accomplished primarily through the adjustable side rails of the frame, with their bolted connections to the remainder of the frame, which can be moved inward or outward on both sides to produce the gage desired; individual wheel shaft assemblies bolted to the underside of the frame, and moved inward or outward with the side rails; and square drive axles, which key themselves automatically to the wheel shaft assemblies and carry only a torque load.

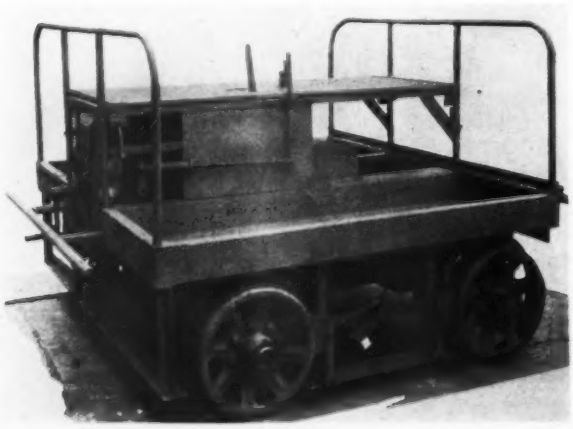
Each of the wheel assemblies, fully enclosed, has a hollow shaft 12 in. long, which runs on two rings of over-size ball bearings, the bearings being enclosed with leather seals and run in a continuous oil bath. Each of the drive axles, of 1½-in. square bar material, fits into opposite wheel bearing assemblies, and is held in position laterally by means of two axle clamps, adjustable to the wheel gage desired. When the wheels are moved inward to gage less than standard, the ends of the drive axles protrude through and extend beyond the outer ends of the wheel assemblies.

The Buda Heavy-Duty, Multi-Gage Car, Pulling One of the Multi-Gage Trailers

The brake shaft, of 1½-in.-square steel tubing, combined with shaft bearings fixed to the side rails of the frame, and a brake crank and toggle arrangement on each side which is independent of the shaft, adapts the braking system to variable gage adjustment as readily as the wheels. In fact, the adjustment is easier, because only two clamps require resetting to effect a change in gage. The complete change from one gage to another requires the removal and replacement of 12 body bolts on each side, the resetting of four drive axle clamps, and the adjustment of the two brake assembly clamps—all of which can be done in from 10 to 20 minutes, depending upon whether two to four men are engaged in the work.

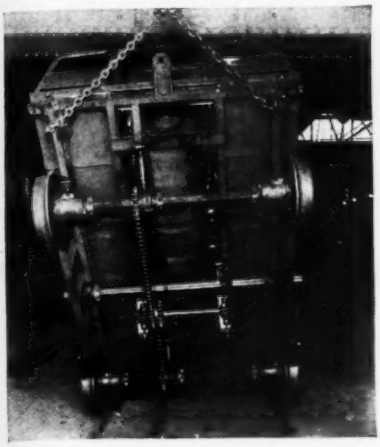
Other features of the heavy-duty car include pipe handrails, 16-in. pressed steel demountable wheels, tool trays and tool box, and extension lift handles at both ends.

The 2 to 4-man multi-gage inspection motor car, as already pointed out, is substantially the same as the Buda "Roadmaster," except for its adjustable gage feature. This car is pow-



The Buda Multi-Gage Inspection Car Is Designed to Carry Two to Four Men

ered by an air-cooled, 7.7 hp. Briggs and Stratton gasoline engine, with magneto ignition, and has a cone friction clutch and chain drive to the rear axle. Through the individually-mounted wheel bearing assemblies, the same as on the heavy-duty multi-



The Underside of the Buda Heavy-Duty Multi-Gage Car, Showing Details of Its Construction

gage car, the inspection car has no front drive axle. In all other respects, it is similar to the heavier car.

The multi-gage trailer car, with a welded steel frame and wood deck, is designed to handle a load of six tons. This car derives its multi-gage feature from the same adjustable features incorporated in the two multi-gage motor cars. The push car has no through axles, but stud axles only, which makes each wheel revolve independently of the other wheels. This feature permits the interchangeability of wheels, bearings and stub axles on all three Buda multi-gage cars.

"Victory" Housing Units

TO MEET the present and future needs in the railroad field for a demountable, portable building unit of economical but substantial construction for various applications, including the housing of employees at labor camps and elsewhere, the Texas Pre-Fabricated House & Tent Company, Dallas, Tex., has developed its "Victory" housing unit. Briefly, this is a fully-prefabricated unit designed for mass production, which was originally developed for housing the armed forces at army camps and elsewhere, and which is said to be highly successful and popular for this purpose.

The basic unit of this form of construction is a structure 16 ft. sq. in plan. However, by omitting wall sections and using connecting floor and ceiling panels, any number of the basic units can be joined to form a structure of almost any size and shape desired, and when this is done, partition-panels are available by means of which the interior can be divided in any desired manner. The components of the basic unit include two floor sections, four wall sections, four roof sections, a metal ventilator, a roof collar and four metal ridges to cover the joints where the roof sections meet, together with foundation blocks and all the necessary bolts, screws and hardware.

Briefly, each floor panel is constructed of 1-in. by 4-in. or 1-in. by 6-in. yellow pine flooring nailed to floor joists, and including the necessary bracing and sills. Each wall section embodies a web-work of 2-in. by 2-in. wood studs with an outside covering of exterior plywood, ⅜-in. thick. Each wall contains a number of large screened windows, all covered by hinged plywood flaps. Several of the windows, instead of wire screens, are covered with Cel-o-glass screening, a translucent material permitting the passage of light but restricting the passage of air. An optional feature is the provision of casement-type sash, glazed with glass, in place of the Cel-o-glass screening.

A special feature of the construction is the design of the roof. This part of the structure, which is of the hip-type, embodies a web-work of timber members, to both sides of which are nailed exterior plywood panels, thereby making a double roof. The roof overhangs the walls and is so constructed as to provide openings under the eaves approximately 2 in. by 22 in. in size, which permit the entrance of air into the space between the outside and inside layers of plywood. Another feature is a metal mosquito-proof ventilator which is placed in the apex of the roof where the four sections meet. Thus, the air entering the openings is free to pass upward between the two layers of plywood and out through the ventilator. In winter, the ventilator accommodates a stove-pipe, and the air space in the double roof becomes an insulating element.

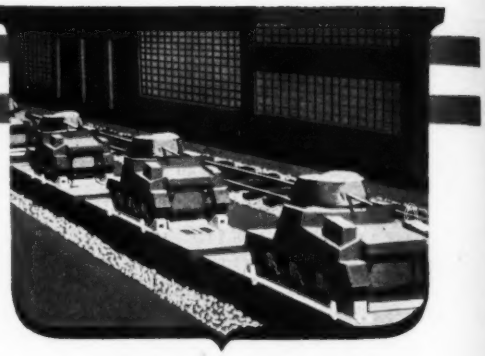
A "Victory" Housing Unit With Casement Windows

It can be seen, therefore, that the roof is designed to stabilize the temperature of the air within the room, and has both ventilating and insulating qualities, so that it helps to keep the interior cool in warm weather and warm in cold weather. It is said that the "Victory" units are being used with entirely satisfactory results in sections of the United States where the winter temperature is quite severe. For use in far northern climates, it is said that a unit with an interior wall panel added, together with the addition of insulation in the walls, the roof, and the floor, with a storm-door entryway, has been tested and found satisfactory at temperatures many degrees below zero.

Advantages claimed for the "Victory" unit are that it is a highly economical form of construction with reference both to initial cost and upkeep; that it can be demounted and moved or stored and erected again for other uses elsewhere; that it is a soundly built, substantial housing unit with an estimated potential life of at least 15 years under normal conditions; and that its erection is a simple operation requiring only a few man-hours to perform. In fact, contractors working on military sites have erected groups of the units in an average of 11 min. each. It is said that 10 of the basic units, having sufficient capacity when erected for housing 50 to 60 men comfortably, can be transported on a 50-ft. car.

Showing How the "Victory" Units Can be Joined Together to Form Larger Structures

NEWS of the Month



Predicts Large Rise in Western Traffic

Each month the American railroads are now moving approximately six times more Army freight and about five times more troops than in World War I, according to an address made by Colonel E. C. R. Lasher, deputy chief of the Traffic Control division of the Army Transportation Corps, before the Trans-Missouri-Kansas Shippers Board at Wichita, Kan., on June 9. He also predicted that when we start offensive action against Japan on a large scale, our forces in the Western Pacific will eventually be built up to many times their present strength, and this will necessitate a still heavier flow of freight and passenger traffic westward.

May Employment Shows Increase Over 1942

Railroad employment during the one-month period from mid-April to mid-May of this year showed an increase of 0.31 per cent (1,345,021 to 1,349,176), while the May total was 6.22 per cent above last year's figures, according to the latest summary of preliminary reports prepared by the Interstate Commerce Commission's Bureau of Transport Economics and Statistics.

The report also showed that May increases over the previous month were all less than one per cent, except in the maintenance of way and structures group, where the rise was 1.37 per cent. Two groups showed a decrease—maintenance of equipment and stores, 0.28 per cent, and train and engine service, 0.13 per cent. However, all groups showed an increase over the previous year.

Railroads Expect More Third-Quarter Steel

A recently-launched drive of the War Production Board to increase steel production by 1,000,000 ingot tons in the third quarter of this year is expected to bring about increased steel allotments to the railroads. The drive was started as a result of a demand from War Mobilization Director Byrnes, who is said to have acted upon presentation from the armed forces. Because of this fact, it is expected that most of the proposed increased production will go for Army and Navy use, but it is considered likely that bigger allotments will be made available to the nation's railways in view of a recent statement of Defense Transportation Director Eastman that "serious consequences" may develop unless the WPB Requirements Committee allocates more materials, especially steel, to the transportation industry.

WPB Announces Frog and Switch Committee

The Director of Industry Advisory Committees of the War Production Board announced the formation on June 12 of a Frog and Switch Industry Advisory Committee to WPB, consisting of T. E. Akers, vice-president of the Ramapo Ajax Corporation; John E. Conley, president of the Conley Frog and Switch Company; L. E. Connelly, president of the Cleveland Frog and Crossing Company; Ralph G. Detmer, manager of the Americal Frog and Switch Company; W. A. Enstrom, general sales manager of the Pettibone-Mulliken Corporation; W. H. Friedline, manager of sales of the Carnegie-Illinois Steel Corporation; R. L. Gillispie, manager of sales of the Bethlehem Steel Company; W. Homer Hartz, president of the Morden Frog and Crossing Works; J. A. Krugler, vice-president of the Taylor Wharton Iron and Steel Company; O. DeGray Vanderbilt, Jr., president of the Weir Kilby Corporation, and L. E. Weidman, vice-president of the Frog, Switch and Manufacturing Company.

C.N.R. Co-operative M of W Committee Meets

The 13th annual meeting of the system committee of the Maintenance of Way Co-Operative Movement of the Canadian National was held recently, with H. A. Dixon, chief engineer of the system, as chairman, and R. C. Vaughan, chairman and president of the company, as one of the principal speakers. The committee, which concerns itself with the working conditions, materials and methods of work of the 21,700 employees engaged in track and structures work throughout the System, sponsors a labor-management co-operative movement which was initiated on the C. N. R. some two decades ago.

In stressing the responsibility placed on maintenance of way employees, Mr. Vaughan, in his opening address, said that "track is the foundation of our railway. I fully realize the heroic efforts you are sometimes called upon to make to meet the very difficult situations which arise. With all modesty, I say we have reason to be grateful for the contributions that we of the Canadian National have been been able to make to the war effort. Our railway is by far the greatest war industry in Canada, and we have demonstrated to the people of Canada, beyond the shadow of a doubt, that the C. N. R. forms one of the greatest assets possessed by this great Dominion."

President Intervenes In Rail Wage Case

President Roosevelt has intervened in the non-operating employees' wage dispute, undertaking to set the stage for further negotiations whereby the employees involved would obtain wage adjustments and other concessions more favorable than those recommended in the recent report of National Railway Labor Panel emergency board. When the board recommended an eight cents per hour increase, the President suggested further labor-management conferences on the proposition of paying time-and-one-half rates for hours worked in excess of 40 per week.

Meanwhile a further complication developed when Fred M. Vinson, stabilization director, issued a statement denying the proposed eight cent increase recommended by the emergency board. This action was said to have been based on the allegation that the board's award did not give full consideration to standards fixed by the War Labor Board and by presidential order prescribing conditions for granting pay increases.

"Small Margin" Left for '43's Peak Load

In comparing the railroads' performance for March, 1943, with that for October, 1942 (peak month of last year) the Interstate Commerce Commission's Bureau of Transport Economies and Statistics has called attention to the "small margin," which "raises the question whether the available cars and locomotives can take care of the seasonal increase to be expected this fall." The comparisons were made in the latest issue of the Bureau's Comment on Transportation Statistics.

The tabulation shows that October, 1942's, revenue ton-miles were only two per cent greater than those for March, 1943; freight car miles only 4.2 per cent greater; freight gross ton-miles, excluding locomotives, only 3.5 per cent greater, and road freight locomotive miles only 0.5 per cent greater. The Bureau suggests that "the fall rise in demand for transportation may be less pronounced this year than in the preceding year," adding that "some additional equipment will be installed before next October."

Personal Mention

General

John P. Kiley, assistant to the general manager of the Chicago, Milwaukee, St. Paul & Pacific, and an engineer by training and experience, has been promoted to assistant general manager of the Eastern lines, with headquarters as before at Chicago.

P. M. Roeper, division engineer of the Panhandle division of the Pennsylvania at Pittsburgh, Pa., has been promoted to superintendent of the Wilkes-Barre division.

H. D. Knecht, division engineer of the Kansas City Terminal and Eastern divisions of the Missouri Pacific, has been promoted to transportation engineer, research bureau, with headquarters at St. Louis, Mo., a newly-created position.

W. C. Jones, chief engineer of the Denver & Salt Lake, who has been serving the government during the past year as chief engineer of the Metals Reserve Company and vice-president of War Materials, Inc., RFC subsidiaries, has been appointed assistant to the general manager of the Denver & Rio Grande Western, with headquarters at Denver, Colo.

Paul D. Fox, auditor of disbursements of the Pennsylvania, and an engineer by training and experience, has been promoted to deputy comptroller, with headquarters at Philadelphia, Pa.

Leonard B. Allen, whose promotion to assistant vice-president, assistant to the president of the Chesapeake & Ohio, with headquarters at Cleveland, Ohio, was reported in the June issue of *Railway Engineering and Maintenance,* was born at Lexington, Ky., on April 19, 1879, and

Leonard B. Allen

graduated in civil engineering from Kentucky State University in 1899. He entered railway service in that year as a rodman on the Southern, and in August, 1899, he went with the C. & O., as a levelman on the location of the Big Sandy division. He served on location and construction work until January 1, 1905, when he was promoted to assistant in the office of the engineer maintenance of way at Richmond, Va., and a year later he was advanced to division engineer of the Kentucky division, with headquarters at Ashland, Ky. Mr. Allen was promoted to engineer maintenance of way of the Kentucky general division, with headquarters at Covington, Ky., on May 1, 1910, and on January 1, 1914, he was further advanced to assistant chief engineer, with headquarters at Richmond. One month later he was appointed superintendent of the Huntington and Big Sandy divisions, with headquarters at Huntington, W. Va., and on July 1, 1916, he was promoted to general superintendent of the Western general division, with the same headquarters. On January 29, 1918, Mr. Allen was advanced to superintendent of maintenance of way for the entire system, with headquarters as before at Huntington, and in October, 1926, he was promoted to assistant to the vice-president, with headquarters at Richmond. Early in 1933, Mr. Allen was appointed assistant to the executive vice-president of the C. & O., and the Nickel Plate, and later of the Pere Marquette, with headquarters at Cleveland, and in May, 1940, he was promoted to assistant to the president of the three roads, the position he held until his new appointment, effective April 28.

Engineering

Harry A. Hampton, division engineer of the Portland division of the Southern Pacific, with headquarters at Portland, Ore., has retired after 35 years' service.

Harry Leard, assistant to the general manager of the Virginian, has been appointed engineer maintenance of way, with headquarters at Roanoke, Va.

C. E. Jacobson has been appointed bridge engineer of the Atlanta & West Point, the Western Railway of Alabama and the Georgia Railroad, with headquarters at Atlanta, Ga.

A. B. Harrison, acting district maintenance engineer on the Chicago, Rock Island & Pacific, with headquarters at Des Moines, Iowa, has been promoted to district maintenance engineer at that point.

J. C. DeJarnette, Jr., supervisor of track of District No. 2 of the Richmond, Fredericksburg & Potomac at Fredericksburg, Va., has been promoted to division engineer, a newly created position, with headquarters at Richmond, Va.

Homer Lindsay Currie, formerly in charge of grade separation for the Canadian National, has been appointed office engineer, with headquarters at Montreal, Que., succeeding **John Andrew Heaman,** who has retired after 42 years' service in the engineering department of that company.

T. O. Manion, roadmaster on the Missouri Pacific at El Dorado, Ark., has been promoted to division engineer of the Arkansas division, with headquarters at Little Rock, Ark., succeeding **C. J. Jaeschke,** who has been transferred to the Eastern and Kansas City Terminal divisions, replacing **H. D. Knecht,** whose promotion to transportation engineer of the research bureau is reported elsewhere in this issue.

R. E. Chambers, whose promotion to district engineer of the Atchison, Topeka & Santa Fe, with headquarters at Los Angeles, Cal., was reported in the June issue of *Railway Engineering and Maintenance,* was born at Clayton, Ill., in 1888, and graduated in civil engineering from Purdue University in 1909.

R. E. Chambers

He entered railway service in 1909 as a transitman on the Pennsylvania at Indianapolis, Ind., and in January, 1912, he became a transitman on the Santa Fe, subsequently serving as draftsman, office engineer and superintendent of bridges and buildings. After serving in the Army during World War I, Mr. Chambers returned to the Santa Fe in 1919 as office engineer at Prescott, Ariz., and in 1921 he was appointed assistant division engineer at Winslow, Ariz. In April, 1929, he was promoted to division engineer, with headquarters at Needles, Cal., and in 1942 he was transferred to San Bernardino, Cal., remaining at that location until his new appointment, effective May 1.

L. E. Smith, whose promotion to acting division engineer on the Los Angeles division of the Atchison, Topeka & Santa Fe, with headquarters at San Bernardino, Cal., was reported in the June issue, was born at Hornell, N.Y., in September, 1887, and in 1909 he entered railroad service as a levelman on the Erie. In September, 1910, he became a draftsman on the Santa Fe at Winslow, Ariz., and later served as inspector, estimator, transitman and assistant engineer. Mr. Smith served as assistant engineer at Fresno, Cal., and Phoenix, Ariz., and as roadmaster at Kingman, Ariz., and Los Angeles, Cal. He was advanced to assistant division engineer at San Bernardino in October, 1942, holding that position until his new appointment, effective May 1.

Carroll K. Hoffmeister, whose promotion to engineer, water supply, of the Texas & Pacific, with headquarters at Dallas, Tex., was reported in the June issue of *Railway Engineering and Maintenance,* was born at Marshall, Tex., on March 24, 1913, and graduated in chemical engineering from the Texas A and M college in 1936. He entered railway service in June, 1936, with the Missouri Pacific and three years later he became inspector of water supply on the T. & P. at Dallas. In May, 1941, he became chemical engineer of the Dearborn Chemical Company at Birmingham, Ala., and returned to the T. & P. as inspector of water supply at Dallas in 1942. In December, 1942, Mr. Hoffmeister was advanced to general inspector of water supply, with the same headquarters,

Carroll K. Hoffmeister

and in March, 1943, he was promoted to the position he held at the time of his new appointment, effective May 1.

W. P. Conklin, track supervisor on the Chicago Terminal division of the Pennsylvania at Colehour, Ill., has been promoted to assistant division engineer of the Columbus division, with headquarters at Columbus, Ohio, a newly-created position. **W. B. Blix,** track supervisor on the Williamsport division, has been transferred to the Chicago Terminal division, succeeding Mr. Conklin.

V. E. Glosup, assistant division engineer of the Rocky Mountain division of the Chicago, Milwaukee, St. Paul & Pacific, with headquarters at Butte, Mont., has been promoted to division engineer of the Trans-Missouri division, with headquarters at Miles City, Mont., succeeding **E. H. Johnson,** who has been transferred to the newly created Idaho division, with headquarters at Spokane, Wash.

J. J. Kasnitz, who has been connected with the engineering department of the Pennsylvania and the Long Island at New York for 15 years, has been commissioned a captain in the United States Army, and is awaiting a call to active duty with the 730th Battalion. The 730th Battalion is an operating unit, composed of Pennsylvania and Long Island railroad officers, and is scheduled to operate railroads in combat service overseas.

P. P. Wagner, division engineer of the St. Louis Terminal and Illinois divisions of the Missouri Pacific, has been appointed engineering assistant to the chief executive, with headquarters at St. Louis, Mo., succeeding **William H. Hobbs,** who has been promoted to director of research. **H. H. Gudger,** roadmaster of the Colorado division, has been advanced to division engineer, with headquarters at Poplar Bluff, Mo., replacing **H. M. Noel,** who has been transferred to the St. Louis Terminal and Illinois divisions, succeeding Mr. Wagner.

Gage Haselton has been appointed assistant division engineer on the Southern Pacific at Portland, Ore., succeeding **G. H. Fair,** whose promotion to division engineer of the Tucson division was reported in the May issue. **Benedict Dolp** has been appointed second assistant division engineer of the Western division at Oakland, Cal., replacing **L. E. Lynn,** who has been advanced to first assistant division engineer. **Kenneth Brunner** has been appointed second assistant division engineer of the San Joaquin division, a newly created position.

I. W. Newman, assistant engineer in the chief engineer's office of the Louisville & Nashville at Louisville, Ky., has been promoted to assistant division engineer of the Cincinnati division, with headquarters at Latonia, Ky.

J. R. Scofield, whose promotion to division engineer on the Illinois division of the New York Central, with headquarters at Mattoon, Ill., was reported in the June issue, was born at London, Ohio, on May 6, 1893, and graduated from Ohio State University in 1916. He entered railway service on April 19, 1920, with the Toledo & Ohio Central (part of the New York Central System) in the division engineer's office at Bucyrus, Ohio, subsequently serving as track foreman and track supervisor until 1926 when he was promoted to assistant engineer of construction at Bucyrus. In 1931 Mr. Scofield became track supervisor at Columbus, Ohio, and on April 1, 1942, he was advanced to assistant engineer in the district engineer's office at Cleveland, holding that position until his new appointment, effective May 1.

William H. Rochester, district engineer of the Southern district of the Western lines of the Atchison, Topeka & Santa Fe at Amarillo, Tex., has been promoted to assistant chief engineer of the Coast lines, succeeding **Maurice B. Clark,** whose death on May 30 is reported elsewhere in these columns. **Joseph A. Noble,** division engineer of Pecos division, at Clovis, N.M., has been promoted to district engineer, Southern district, of the Western lines at Amarillo, relieving Mr. Rochester, and **Willard R. Baker,** roadmaster at Clovis, has been advanced to division engineer of the Pecos division, replacing Mr. Noble.

Mr. Rochester was born at Pendleton, S.C., on February 1, 1891, and attended Clemson College, Calhoun, S.C., and Porter Military Academy, Charleston, S.C. He entered railroad service in 1915 as a draftsman on the Nashville, Chattanooga & St. Louis, and in October of the same year he became a chainman on the Santa Fe at Arkansas City, Kan. Mr. Rochester subsequently served as rodman, transitman and computer at various points

William H. Rochester

on the road until April, 1926, when he was promoted to assistant engineer in charge of construction, with headquarters at Chicago. In May, 1930, he was advanced to construction engineer at Chicago and seven years later he was promoted to district engineer, with headquarters at Amarillo, holding that position until his new appointment, effective June 7.

John H. Kelly, engineer of track of the New York Central, Buffalo and East, has been promoted to engineer maintenance of way of the Lines Buffalo and East, including the Boston & Albany, with headquarters as before at New York, to succeed **G. N. Edmondson,** who has been granted a leave of absence because of ill health. **J. N. Grim,** division engineer of the Electric division, with headquarters at New York, has been promoted to engineer of track to succeed Mr. Kelly. **F. G. Smith,** division engineer of the Buffalo division, with headquarters at Buffalo, N.Y., has been transferred to the Electric division at New York, to succeed Mr. Grim, and **F. B. Wilcox,** division engineer of the St. Lawrence, Adirondack and Ottawa divisions, with headquarters at Watertown, N.Y., has been transferred to Buffalo to replace Mr. Smith. **C. T. Gunsallus,** supervisor of track with headquarters at Beacon, N.Y., has been promoted to division engineer, with headquarters at Watertown, to replace Mr. Wilcox.

Charles V. Chamberlin, assistant division engineer of the Electric division, has been promoted to assistant engineer of track, with headquarters as before at New York, to succeed **Francis A. Haley,** whose appointment as supervisor of track is noted elsewhere in these columns. **Clarence C. Lathey,** assistant engineer on the Electric division, has been promoted to assistant division engineer on the same division to succeed Mr. Chamberlin. **P. S. Burnham,** assistant supervisor of track, with headquarters at Batavia, N.Y., has been appointed assistant engineer at New York to replace Mr. Lathey. A biographical sketch and a photograph of Mr.

(Continued on page 532)

Here It Is ☆ ☆

WOOLERY Junior Weed Burner

The above picture shows the WOOLERY JUNIOR WEED BURNER mounted on an all-steel Trailer Car with over-all length of 96" x 56½" wide on which a circular track is built so that the burner unit can be swung thru an arc of 180 degrees by the operator. When burner tube is set at right angles it will burn to a distance of 10 feet from center of track, thereby permitting burning 25 feet between tracks as well as ditches, slopes, etc. The Trailer Car is arranged to regularly carry 2 drums of fuel oil, but 4 drums can be carried, which is sufficient for one-half day's burning.

The whole burner unit is held in any desired position by a friction brake shoe bearing on the circular track. Leverage for swinging the burner is provided by a lever pivoted between the two uprights. When this lever is clear up or clear down the brake is *on* so the burner will stay in position without holding. When the lever is swung out for use the brake is automatically released. The free end of the lever is "U" shaped and when it is inclined below center it may be operated by the leg and when above, by hand. By removing one bolt, burner unit can be taken off Trailer Car and mounted on Truck or Tractor for off-track use.

The JUNIOR Burner has an oil burning capacity of 60 g.p.h. and produces a dense, high velocity, intensely hot flame which sears green vegetation quickly. Under average conditions the first trip can be made at about 8 m.p.h. and on the second trip, which should be made from 2 to 10 days later, after the sun has dried the vegetation, the speed may be much faster—10 to 20 m.p.h.

The Burner itself requires only one man to operate, with a considerable saving in maintenance costs. By setting the center of the burner head slightly outside the rail and making a round trip the whole tie area and shoulder can be turned to a width of about 12 ft. rapidly and economically.

WOOLERY MACHINE COMPANY MINNEAPOLIS MINNESOTA

Kelly were published in the August, 1942, issue, page 566.

Mr. Grim was born at Newtown Square, Pa., on June 7, 1892, and is a graduate in civil engineering of Pennsylvania university. He entered railway service with the New York Central on June 7, 1913, as a chainman at Albany, N.Y., being advanced to rodman on June 16, 1914, and thence to transitman on October 16, of the latter year. On May 16, 1916, Mr. Grim was appointed bridge and building inspector with headquarters at Utica, N.Y., being promoted to assistant supervisor of bridges and buildings at the same point on November 1, 1916. He was appointed assistant supervisor of track with headquarters at West Albany, N.Y., on November 19, 1921, and became assistant division engineer at Utica on June 1, 1925. He was further promoted to supervisor of track with headquarters at Remsen, N.Y., on May 22, 1927, being advanced to division engineer of the Adirondack and Ottawa divisions at Utica on October 1, 1927. On April 1, 1934, he became division engineer of the River division with headquarters at Weehawken, N.J., and on October 1, 1940, he was transferred to the Eastern division with headquarters at New York. On July 1, 1942, he was transferred to the Electric division, with the same headquarters, which position he was holding at the time of his recent promotion to engineer of track.

Track

A. M. Hamm has been appointed acting roadmaster on the St. Louis-San Francisco at Pittsburgh, Kan., succeeding **E. E. Pruitt,** deceased.

T. H. Nelson has been appointed roadmaster on the Southern Pacific, with headquarters at Glendale, Cal., succeeding **T. J. VanZandt,** who has been transferred to Truckee, Cal.

James A. Toliver, track supervisor on the Pecos division of the Atchison, Topeka & Santa Fe, has been promoted to roadmaster at Clovis, N.M., succeeding **Willard Baker,** whose promotion to division engineer of the Pecos division is reported elsewhere in these columns.

W. R. Kauffman, assistant on the engineering corps of the Eastern region of the Pennsylvania, has been promoted to assistant supervisor of track on the New York division, with headquarters at Jamesburg, N.J., to succeed **W. M. McCracken,** who has been transferred.

G. A. Hendrix has been appointed acting roadmaster on the Northern district of the Missouri-Kansas-Texas, with headquarters at Parsons, Kan., succeeding **H. H. Evans,** who has been transferred temporarily to the Kansas City division, with jurisdiction over rail laying and surfacing work.

J. E. Price, assistant supervisor of track on the New York Central at Corning, Ohio, has been promoted to supervisor of track, with headquarters at Columbus, Ohio, succeeding **R. J. McEwen,** whose transfer to Bryan, Ohio, was reported in the June issue. **George W. Deblin,** instrumentman at Toledo, Ohio, has been advanced to assistant supervisor of track at Bryan, a newly-created position.

P. M. Piper, assistant supervisor of track on the Chicago & Eastern Illinois, has been promoted to supervisor of track at Marion, Ill., succeeding **Bruce James,** deceased. Mr. Piper was born at Ina, Ill., on December 15, 1895, and entered the service of the C. & E. I. in March, 1913, as a section laborer. In August, 1922, he was promoted to section foreman and worked alternately as a section foreman and as foreman of a track welding gang until August, 1942, when he was promoted to assistant supervisor of track.

J. C. Houston, supervisor of track on the New York Central at Columbus, Ohio, has been promoted to assistant engineer in the division engineer's office at Chicago. **J. W. Carnohan,** assistant supervisor of track, with headquarters at Sandusky, Ohio, has been advanced to supervisor of track at Columbus, succeeding Mr. Houston. **H. E. Boyer,** extra gang foreman at Lexington, Ohio, has been promoted to assistant supervisor of track, succeeding **C. L. Spitzer,** who has been transferred to Columbus. **Robert Winke,** extra gang foreman at Sandusky, has been advanced to assistant supervisor of track, with the same headquarters, succeeding Mr. Carnohan.

Joseph H. Bell, assistant roadmaster for the Atchison, Topeka & Santa Fe at San Bernardino, Cal., has been promoted to roadmaster, Second district of the Valley division, with headquarters at Fresno, Cal., succeeding **George Santhu,** whose death on May 11, is reported elsewhere in these columns.

Francis A. Haley, assistant engineer of track of the New York Central, Buffalo and East, with headquarters at New York, has been appointed supervisor of track, with headquarters at Selkirk, N.Y., to succeed **P. B. Garrison,** who has been transferred to Beacon, N.Y., to replace **C. T. Gunsallus,** whose promotion to division engineer is noted elsewhere in these columns. **F. A. Williams,** a rodman in the engineering department, with headquarters at Jersey Shore, Pa., has been promoted to assistant supervisor of track at Batavia, N.Y., to succeed **P. S. Burnham,** whose appointment as assistant engineer at New York is noted elsewhere in these columns. A sketch of Mr. Haley's railroad experience was published in the February, 1943, issue, page 128.

L. M. Kuhn, assistant supervisor of track of District No. 1 of the Richmond, Fredericksburg & Potomac at Richmond, Va., has been promoted to supervisor of track of District No. 2, with headquarters at Fredericksburg, Va., succeeding **J. C. DeJarnette, Jr.,** whose promotion to division engineer is reported elsewhere in these columns. **J. A. Blalock,** assistant supervisor of track of District No. 2 at Fredericksburg, has been transferred to Richmond, relieving Mr. Kuhn, and **J. R. Pitts,** general foreman of rail laying and ballasting forces, has been advanced to assistant supervisor of track at Fredericksburg, replacing Mr. Blalock.

G. A. Thomas, assistant supervisor of track, Potomac yard, has been promoted to supervisor of track, Potomac yard, succeeding **C. E. Dare,** who has retired after more than 50 years' railroad service. **H. H. Hopkins, Jr.,** formerly with the Baltimore & Ohio, has been appointed assistant supervisor of track, Potomac yard, relieving Mr. Thomas.

Bridge and Building

J. A. Hanson has been appointed bridge and building supervisor of the New York Central at Mt. Carmel, Ill., succeeding **L. W. Moss,** who has been appointed assistant engineer, with headquarters at Mattoon, Ill.

F. L. Lee, assistant master carpenter of the New York division of the Pennsylvania, with headquarters at Jersey City, N.J., has been promoted to master carpenter of the Cincinnati division, with headquarters at Cincinnati, Ohio. **J. R. Maxwell,** bridge and building apprentice on the Eastern region, has been promoted to assistant master carpenter at Jersey City to replace Mr. Lee. **G. P. Hayes,** assistant master carpenter of the Philadelphia Terminal division, Philadelphia, Pa., has been appointed acting master carpenter of that division.

Obituary

Wiley W. Reeder, who retired as a track supervisor on the Louisville & Nashville at Evansville, Ind., on November 1, 1940, died recently.

Thomas J. Gladwell, who retired in 1941 as supervisor of bridges and buildings on the Louisville & Nashville, died at Pensacola, Fla., recently.

George Santhu, roadmaster of the Second district of the Valley division of the Atchison, Topeka & Santa Fe, with headquarters at Fresno, Cal., died suddenly in that city on May 11.

Maurice B. Clark, assistant chief engineer of the Coast lines of the Atchison, Topeka & Santa Fe, with headquarters at Los Angeles, Cal., died at San Bernardino, Cal., on May 30. A photograph of Mr. Clark and a biographical sketch of his career appeared in the June issue in connection with his recent promotion to the position he held at the time of his death.

Paul T. Robinson, who retired in January, 1938, as engineer maintenance of way and structures of the Southern Pacific, with headquarters at San Francisco, Cal., died at Berkeley, Cal., on May 14. Mr. Robinson was born at Hubbard, Iowa, on February 12, 1882, and was educated at Rose Polytechnic Institute, Terre Haute, Ind. He entered railway service with the Union Pacific in June, 1900, serving as an axman, rodman, instrumentman and draftsman until July, 1905, when he was appointed assistant engineer on construc-

(Continued on page 534)

Rail Cropped in Track!

MULTIPLE RAIL CROPPING WITH RACINE HIGH SPEED PORTABLE RAIL SAWS
Actual photos taken right on the job showing Racine Rail Saws at work. Note the portability of these saws in the lower photo.

RACINE *High Speed* Portable Rail Saws

Conserve STEEL—TIME *and* LABOR

Racine's rail cropping method conserves steel, reduces manpower and lessens traffic delays. Racine High Speed Portable Rail Saws help solve your rail maintenance problems caused by increased traffic. Since you can crop rails anywhere in the track—no need for relaying complete sections—no heavy "on track" equipment necessary.

BETTER RAIL JOINTS AT LOWER COST

One important road reports that rail cropping not only produced better joints, but in addition lowered maintenance costs 10% and increased rail life six years. 85-lb. rails were cut in 3 to 5 minutes—an average of 150 rails cropped in one day! Sixty-six men did this rail cropping job at a cost of only $2.20 per rail—including marking of rail, drilling for new joints, sawing, removing spikes, etc., under varying weather and traffic conditions. Alert roads are today taking advantage of Racine's rail maintenance method. Racine Portable Rail Saws are available with either gas engines, electric motors or air motors. Complete information and prices on request, address Dept. RE-S.

Investigate Racine's complete line of Hydraulic Metal Cutting Machines. Capacities 6" x 6" to 20" x 20".

Read the report of one of the nation's leading railroads about rail cropping with Racine Saws, featured in this issue.

RACINE — STANDARD FOR QUALITY AND PRECISION — RACINE TOOL and MACHINE CO.

RACINE TOOL and MACHINE COMPANY
STANDARD FOR QUALITY AND PRECISION
RACINE, WISCONSIN • U. S. A.

tion, serving in this capacity until December, 1906, when he was appointed chief draftsman. Mr. Robinson entered the service of the Southern Pacific in January, 1908, serving as office engineer and assistant engineer on the Sacramento division until January, 1912, when he was appointed a roadmaster on the same division. In September, 1913, he was transferred to the Stockton division as assistant division engineer. From March to December, 1917, Mr. Robinson served as engineer for the assistant general manager at Los Angeles, Cal., then being appointed special engineer in the general manager's office at the same point. In May, 1918, he was appointed assistant division engineer of the Los Angeles division and during federal control of the railroads, he served as division engineer of the San Joaquin division. At the end of this period Mr. Robinson was appointed assistant division engineer of the Western division, being promoted to division engineer of the East Bay Electric division, with headquarters at Oakland, Cal., in January, 1922. In November, 1923, he was advanced to division engineer of the Tucson division and in October, 1934, he was promoted to engineer maintenance of way and structures, with headquarters at San Francisco, which position he held until his retirement.

The death on June 2, of **John F. Stevens** at Southern Pines, N.C., marked the passing of an engineer whose name is indelibly associated with the era of greatest railroad expansion in the northwestern United States and Canada. Probably the most spectacular individual achievement of his career was the discovery of Marias Pass in 1889, which gave the Great Northern a favorable opening through the Rocky Mountains for its extension to the Pacific Coast. The discovery of the pass is memorialized in the form of a heroic bronze statue of Mr. Stevens as he appeared at the time of the discovery, which was erected by the Great Northern at the summit of the pass on July 1, 1925. Later in his career, Mr. Steven's name was identified in important engineering and executive capacities with various railroads, with the construction of the Panama Canal, and with the re-organization of the Trans-Siberian and Chinese Eastern Railways during the first World War.

A native of West Gardiner, Me., Mr. Stevens was born on April 25, 1853. His long engineering career began as assistant engineer of the City of Minneapolis, Minn., in 1874. He entered railway service in 1876 as chief engineer of the Sabine Pass & Northwestern, and for the next 25 years or more he participated actively in the location and construction of various lines in the West, Northwest and Canada. His connections included those of assistant engineer on the Denver & Rio Grande (1879-1880); assistant engineer, Chicago, Milwaukee & St. Paul (1880-1882); assistant engineer and division engineer, Canadian Pacific (1882-1886); assistant engineer C. M. & St. P. (1886); principal assistant engineer, Duluth, South Shore & Atlantic (1887-1889); and assistant engineer, Spokane Falls & Northern (1889), this latter company later being incorporated as part of the Great Northern. In 1890, Mr. Stevens became principal assistant engineer of the Great Northern, being advanced to assistant chief engineer in 1893, and thence to chief engineer in 1895. In June, 1902, he became also general manager of this road, but resigned early in the spring of 1903 to become chief engineer of the Chicago, Rock Island & Pacific. Later in the same year, he was elected fourth vice-president

John F. Stevens

of the Rock Island, becoming second vice-president in April, 1904.

In July, 1905, Mr. Stevens became chief engineer of the Isthmian Canal Commission, and for the next two years he was in charge of the construction of the Panama Canal. On leaving the service of the commission in 1907, he became vice-president of the New York, New Haven & Hartford. In September, 1909, after spending several months developing new railway lines in Oregon, he became president of a group of short lines in the Pacific Coast area. From 1911 to 1913, Mr. Stevens headed his own construction company, at New York, and from the latter year until 1917 he served as consulting engineer for various eastern railways. When the United States entered the first World War, the railways of Russia were in a chaotic state, and to help in restoring them, a commission of American railway experts was created which was headed by Mr. Stevens. Later he became President of the Inter-Allied Technical Board which was created to supervise the reorganization of the Siberian and Chinese Eastern Railways. In the years following his return to the United States in 1923, Mr. Stevens returned to his private engineering practice. More recently he had spent much of his time at his home at Southern Pines, N.C.

For his achievement in his engineering field, Mr. Stevens was honored by various technical societies, educational institutions and even governments. He was awarded the John Fritz medal in 1925, and the Hoover medal of the American Society of Civil Engineers in 1935, and was also a recipient of the Gold medal of the Franklin Institute. Among his governmental awards was the Distinguished Service Medal of the United States, and decorations by various governments in the allied group for service rendered during the first World War.

Association News

Wood-Preservers' Association

The officers are now organizing committees to conduct the work of the association during the current year of the association, which is now opening.

Roadmasters' Association

President E. L. Banion contemplates calling a meeting of the Executive committee late this month to receive and pass upon the preliminary drafts of reports that are being prepared by committees.

Bridge and Building Association

President G. S. Crites plans to call a meeting of the Executive committee late in July to review the work being done by various technical committees of the association.

American Railway Engineering Association

Two standing committees of the association held meetings in June, and two have thus far scheduled meetings in July. The meetings in June were those of the Committee on Roadway, which met in Chicago on June 1 and 2, and the Committee on Masonry, which met in Cleveland, Ohio, on June 24. In July, the Committee on Water Service, Fire Protection and Sanitation will meet in Chicago on July 13, and the Committee on Buildings will meet in Chicago on July 28 and 29.

Both the 1943 volume of the proceedings and the annual Supplement to the Manual, the latter incorporating all additions to and revisions of Manual material as a result of association action, are now off the presses and will be mailed to members shortly after the first of July.

Supply Trade News

General

The Army-Navy E has been awarded to the **Union Metal Manufacturing Company**, Canton, Ohio, at ceremonies attended by over 1500 employees, their families and friends.

The Lufkin Rule Company, Saginaw, Mich., has been awarded the Army-Navy "E" for excellence in the production of war material.

J. H. Williams & Co. has removed its stock products sales office from 225 Lafayette Street, New York, to its plant at Buffalo, N.Y. A local sales office will be maintained at the Lafayette Street address.

The Army-Navy "E" award, for high achievement in producing materials needed for war, was awarded the officers and employees of the **Mall Tool Company**,

(Continued on page 536)

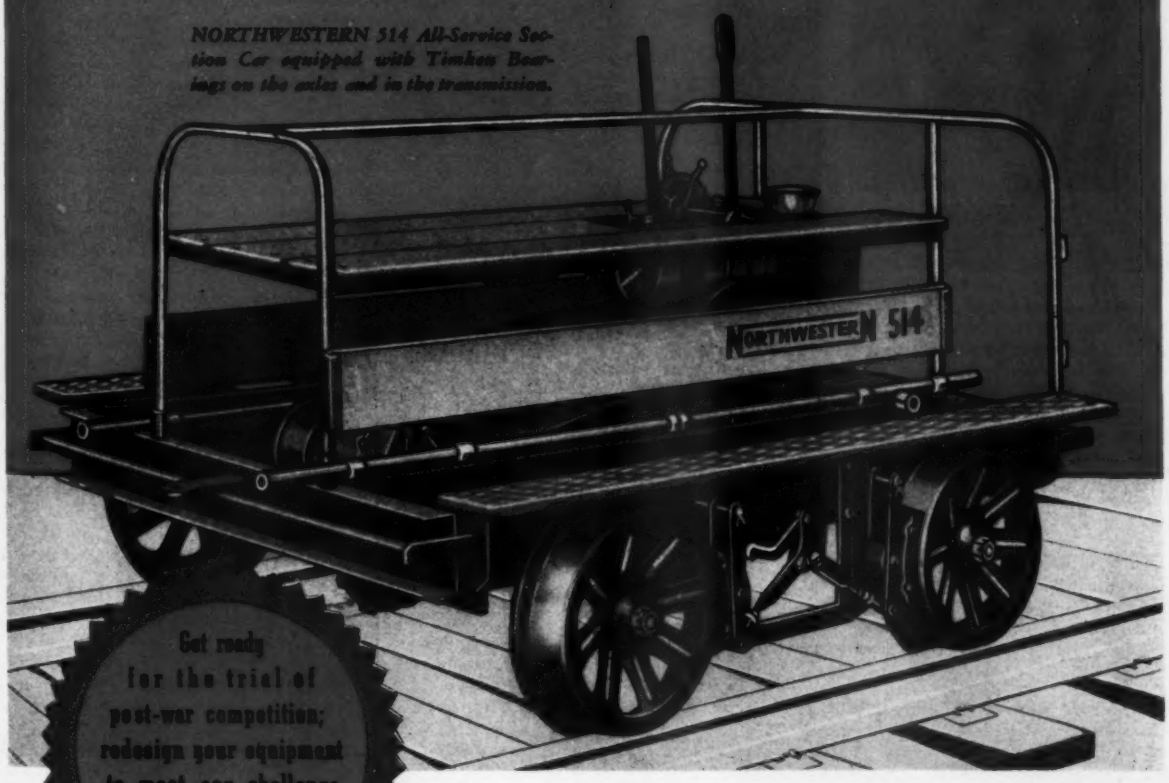
TIMKEN BEARINGS keep section gangs rolling

Everything else being equal, section cars equipped with Timken Bearings on the axles will outperform cars not so equipped. They are faster; need less attention for lubrication and general upkeep; possess greater endurance; are always ready for service.

The bearing qualities that give section cars these advantages have made Timken Tapered Roller Bearings preferred for the great majority of modern locomotives, cars and streamlined trains. They are, scientific design; precision manufacture; and the use of Timken Steel—the finest material ever developed for anti-friction bearings.

Make sure your new section cars are Timken Bearing Equipped. The Timken Roller Bearing Company, Canton, Ohio.

NORTHWESTERN 514 All-Service Section Car equipped with Timken Bearings on the axles and in the transmission.



Get ready for the trial of post-war competition; redesign your equipment to meet any challenge and use more Timken Bearings.

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS

Chicago, in a ceremony at the plant on June 22.

At the annual meeting of the **Douglas Fir Plywood Association** at Tacoma, Wash., on May 25, N. O. Cruver, vice-president of Wheeler Osgood Sales Corporation, was re-elected president of the association for a second term.

The Maritime "M" pennant and the Victory Fleet flag were awarded the officials and employees of the **Nordberg Manufacturing Company,** Milwaukee, Wis., for outstanding achievement in war production, in a ceremony held at the company's plant on May 17.

Personal

George L. Rieger has been appointed assistant general superintendent of the Ramapo Ajax Division of the **American Brake Shoe Company,** with headquarters at 230 Park avenue, New York. Mr.

George L. Rieger

Rieger was born in 1891. He joined the Ajax Forge Company in July, 1916, as a planer hand and a few years later he was transferred to the company's Chicago plant as assistant foreman. He was promoted to foreman in 1927 and was transferred to the Los Angeles plant. A year later he was transferred back to Chicago as general foreman.

Mr. Rieger was appointed superintendent of the Ramapo Ajax plant at Hillburn, N.Y., in 1940, serving in that capacity until his recent promotion.

Edward B. McConville, comptroller of **Skilsaw, Inc.,** Chicago, has been elected treasurer of that company. Mr. McConville was treasurer of Finch, Van Slyck and McConville, St. Paul, Minn., before he joined Skilsaw as comptroller in 1942.

Gordon S. McKenty, an expeditor on government munitions contracts, working out of the Vicksburg, Miss., and Tournapull, Ga., factories of **R. G. LeTourneau, Inc.,** has been appointed general parts department manager of that company, with headquarters at Peoria, Ill., to supervise parts sales, orders and shipping activities.

In recognition of the growing importance of export markets, the **Whiting Corporation,** Harvey, Ill., has appointed **R. Elliott Maxwell,** vice-president and director, as export manager, with headquarters at 136 Liberty street, New York. Prior to his association with the Whiting Corporation, Mr. Maxwell was for many years connected with the Carnegie-Illinois Steel Corporation.

Roy E. Smith, division manager of **Armco Drainage & Metal Products, Inc.,** Middletown, Ohio, has resigned to become sales manager of the Kelly O'Leary Steel Works.

N. R. Knox, formerly vice-president in charge of manufacturing, has been elected president of the **Bucyrus-Erie Company,** South Milwaukee, Wis. He succeeds **W. W. Coleman,** who has been re-elected chairman of the board.

John S. Gregg has been appointed district sales manager of the Cincinnati sales office of the **Inland Steel Company.** Mr. Gregg, until his recent transfer to Cincinnati, covered the Wisconsin territory out of the company's Milwaukee sales office. He had been associated with Inland Steel since October 1, 1935. Prior to that time he was employed by the Moise Steel Company, Milwaukee, Wis. **Kenneth J. Burns,** who formerly headed the Cincinnati sales office, is now located in an executive capacity in the company's Plate and Shape sales division in Chicago.

Gail E. Spain, vice-president in charge of operations at San Leandro, Cal., for the **Caterpillar Tractor Company,** Peoria, Ill., has been appointed vice-president in charge of the advertising, sales, export,

Gail E. Spain

engine sales, special products and war contracts departments, with headquarters at Peoria, succeeding **D. A. Robison,** who has resigned to become Caterpillar distributor at Salt Lake City, Utah.

Mr. Spain was born at Portland, Ore., and graduated from Oregon State College in 1920 with the degree of mechanical engineer. In the same year he joined the Willamette Iron & Steel Works, Portland, serving in the sales and engineering departments and later as sales manager. He joined his present company in 1929 as a logging representative and served in various administrative positions, being promoted to general sales manager in 1940.

Frank Parker, president of **Iron & Steel Products, Inc.,** Chicago, has been elected chairman of the board, and has been succeeded by **Albert G. Bladholm,** secretary. **John F. Parker,** vice-president, has been elected vice-president and treasurer; **William J. Parker,** vice-president, has been made vice-president and secretary and **Royal J. Casper** has been appointed assistant secretary. In 1905, Mr. Parker entered the employ of the Republic Iron & Steel Co., and in 1917 resigned from the position of general superintendent, Western division, to engage in the scrap-iron and general iron and steel salvage and equipment business. In 1930 he formed Iron & Steel Products, Inc.

Mr. Bladholm entered the scrap-iron and general iron and steel salvage and equipment business in 1923. In 1930 he assisted in forming Iron & Steel Products, Inc., and became its secretary, the position he was holding at the time of his recent election.

Arthur W. Preikschat, manager of the Car Equipment division of the **National Lock Washer Company,** Newark, N.J., has been appointed vice-president in charge of manufacturing of the company, with headquarters at Newark. Mr. Preikschat was born at Detroit, Mich., on November 1, 1893, and attended the Armour Institute of Technology. He became associated with the Pullman Company in 1911, serving four years in the drafting and template departments and five years as assistant to the engineer of tests. He then served with the Steel & Tube Company of America, as mechanical representative in the purchasing department; with the Liberty Steel Products Company, Inc., as assistant mechanical engineer; and with Templeton, Kenly & Co., as special engineer in the railway sales department. In April, 1922, Mr. Preikschat went with the National Lock Washer Company as western manager of the Car Equipment division, later being advanced to manager of that division.

Trade Publications

Link-Belt LS-120.—A 12-page illustrated catalog, No. 1943, has been published by the Link-Belt Speeder Corporation, Chicago, describing its 1¼-yd., heavy-duty model LS-120 crawler shovel-crane-dragline. The catalog describes the construction and operating features of the LS-120 and includes general dimensions, clearances, lifting capacities and specifications.

Welding and Brazing Aluminum.—A 100-page booklet entitled Welding and Brazing Alcoa Aluminum has been published by the Aluminum Company of America, Pittsburgh, Pa. This completely rewritten edition of the welding booklet issued by this company, as the title indicates, now covers brazing. The booklet explains in detail various methods of gas, arc and electric-resistance welding and the furnace, torch and dip processes of brazing aluminum. It is well illustrated with numerous photographs and drawings.

BUDA TIE NIPPER

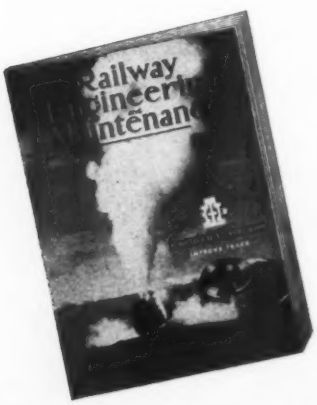
PUTTING this handy tool on the job is like adding another man to the gang . . . it holds the tie firmly against the rail for spiking or tamping, while the man formerly needed to pry up the tie, is released for other work! Write for details — now!

THE BUDA CO.
Harvey (CHICAGO SUBURB) Ill.

PUSH CARS | JACKS *for every purpose* | MOTOR CARS | *Maintenance of way* EQUIPMENT

ON THE DESK

IN THE POCKET



ALWAYS ON THE JOB

"Sure To Reach Them"

"Bill, what are you so quiet about?" asked the railway sales manager of his star salesman.

"I've been thinking," replied the star salesman.

"About what?"

"About how much we could help our railway friends if they only knew what our equipment can do for them."

"I suppose—"

"These maintenance officers are up against the toughest battle they've ever faced. Big programs and no men. Incidentally, it's a set-up for us."

"Bill, it's the opportunity we've been looking for for years. It's your job and mine to get our story across to them."

"I'm doing the best *I* can. But with so many new men to see, with them out of their offices so much of the time and with travel so difficult, I can't make as much progress as I would like. We've got to find some other way."

"That's what you were thinking about?"

"Yes."

"What's your suggestion?"

"I'm not sure, yet. But everywhere I go I have noticed the magazine *Railway Engineering and Maintenance*—on their desks or in their pockets. They *all* get it *and they all read it.* And I don't mean maybe."

"That leads to an idea, Bill. We can put our story in the advertising pages of that magazine and get it before these men. We can be *sure* to reach them that way."

"That's right—all of 'em—*and when they have time to absorb it.*"

"That's a smart idea, Bill. We'll start at once—and we'll be in line with the thinking of other live companies in the field for I notice that the advertising in that magazine has increased over 35 per cent lately."

RAILWAY ENGINEERING AND MAINTENANCE IS READ BY MAINTENANCE OFFICERS OF ALL RANKS

BURRO CRANES

WHEREVER RAILS RUN

and there is work to be done

BURRO CRANES

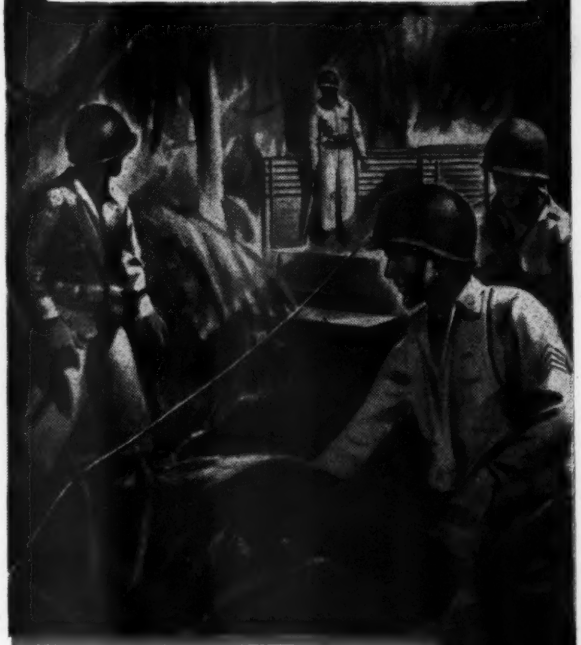
★ BURRO CRANES go wherever there's work to be done—go under their own power pulling their work train with them, or go on a flat car if need be. Compact, efficient, powerful and engineered to meet actual railway working conditions, BURRO CRANES will operate in the closest quarters—turn completely around without fouling adjacent track, have elevated boom heels that permit close-in work over a 5 ft. gondola side or end, etc.

They are the best all-round maintenance "tools" you can have, because they get in on every job and handle them all well.

CULLEN-FRIESTEDT CO.,
1301 S. KILBOURN AVE. CHICAGO, ILLINOIS

WHERE COMMUNICATION LINES ARE *Vital*

How often the outcome of battle "hangs by a thread" — the communication line that must be established and maintained even under fire! On many fronts, reels powered by small gasoline engines help lay these vital lines. Thus thousands more Briggs & Stratton engines swell the ranks of the hundreds of thousands of these rugged, dependable engines already serving our armed forces in many ways.



IN the interest of most efficient engine operation, all users of Briggs & Stratton 4-cycle, air cooled gasoline engines are urged to maintain the following

4-POINT SERVICE PROGRAM

1. ***Frequent lubrication with proper oils.***
2. ***Periodical engine inspection.***
3. ***Always keep engines properly adjusted.***
4. ***Keep engines clean.***

This systematic care will not only assure better, longer engine service—but will prevent unnecessary repairs, thus saving critical materials for war uses.

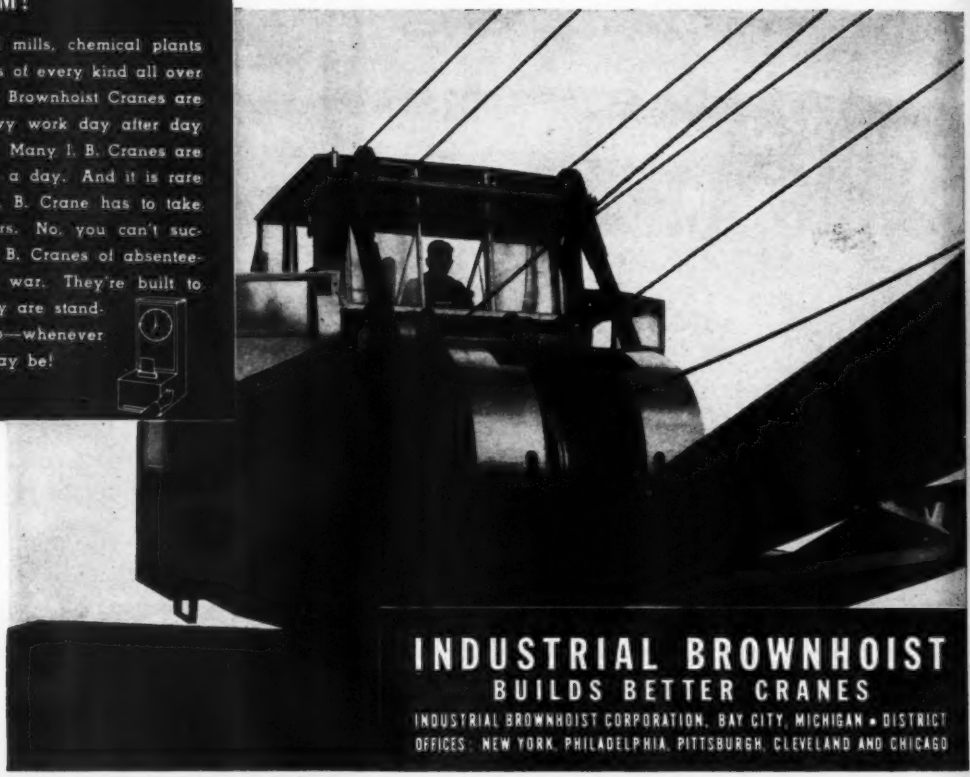
So, keep your engines in good condition. Your Briggs & Stratton Service Station or nearest dealer will gladly help you.

BRIGGS & STRATTON CORPORATION
Milwaukee, Wis., U.S.A.

Invest In Freedom
BUY WAR BONDS

YOU CAN'T ACCUSE AN I. B. CRANE OF ABSENTEEISM!

In shipyards, steel mills, chemical plants and big war plants of every kind all over America, Industrial Brownhoist Cranes are doing steady, heavy work day after day without a letdown. Many I. B. Cranes are operating 24 hours a day. And it is rare indeed when an I. B. Crane has to take time out for repairs. No, you can't successfully accuse I. B. Cranes of absenteeism in this man's war. They're built to stand up—and they are standing up on their job—whenever and wherever it may be!

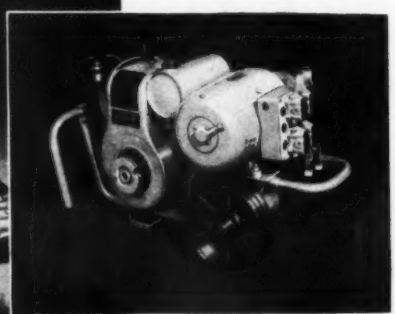


INDUSTRIAL BROWNHOIST
BUILDS BETTER CRANES
INDUSTRIAL BROWNHOIST CORPORATION, BAY CITY, MICHIGAN • DISTRICT OFFICES: NEW YORK, PHILADELPHIA, PITTSBURGH, CLEVELAND AND CHICAGO

A COMBINATION OF
GREAT FLEXIBILITY

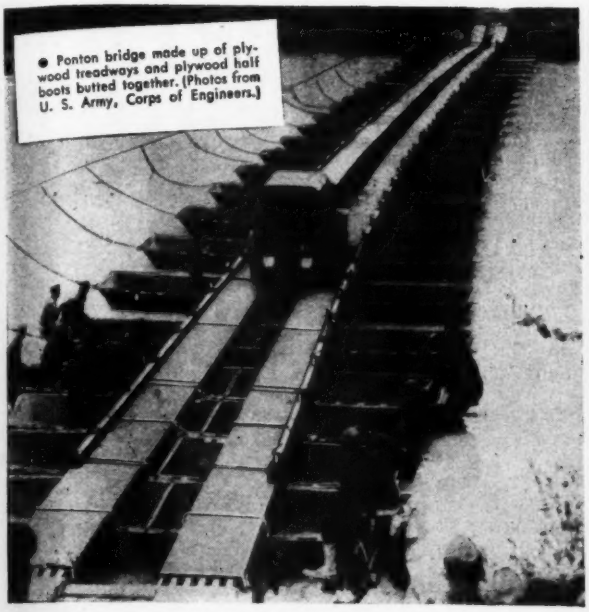
JACKSON Vibratory Tampers with the JACKSON WS-4 Portable Power Plant offer those responsible for track maintenance a combination of great flexibility and adaptability. The WS-4 can operate either two or four tampers and many have found it advisable to use two such units rather than one larger power plant. (Although we make both.)

The JACKSON WS-4 Power Plant has only a 64-pound lift at handles, thus being easily portable. It is simple and sturdy in construction, giving maximum performance day in and out. And the JACKSON Vibratory Tamper handles all types of ballast, filling all voids with perfect uniformity . . . with ease.



JACKSON
Tampers

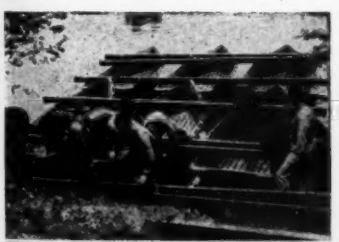
ELECTRIC TAMPER & EQUIPMENT CO.
Ludington, Michigan



● Ponton bridge made up of plywood treadways and plywood half boats butted together. (Photos from U. S. Army, Corps of Engineers.)

ASSAULT... with Douglas Fir Plywood

U. S. Army Engineers make extensive use of this Miracle Wood for Assault Boats and Emergency Bridges!



● Exterior-type Douglas Fir Plywood has definite advantages for the Army Engineers: It makes their assault equipment strong, durable and waterproof, yet keeps it lightweight for easy handling and transportation. For these reasons — and many others — Douglas Fir Plywood is serving virtually every branch of our armed forces and hundreds of war industries as well. And as a result of this extraordinary war experience, the Douglas Fir Plywood you buy after Victory will be more useful to you than ever before.

● *Left above:* Army Engineers build ferry for trucks and guns by using 10-passenger plywood assault boats. *Left:* two plywood assault boats transport jeep and soldiers across river.

TO HELP SPEED VICTORY the Douglas Fir Plywood Industry is devoting its entire capacity to war production. We know this program has your approval.

SEND FOR WAR USE FOLDER

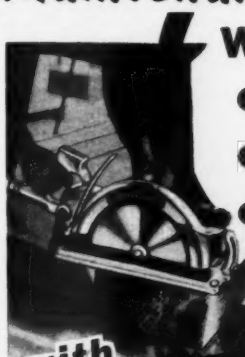
● Dozens of actual photographs show you how Douglas Fir Plywood is aiding the war effort. Write Douglas Fir Plywood Assn., Tacoma, Washington, for your free copy.

DOUGLAS FIR PLYWOOD

Real Lumber

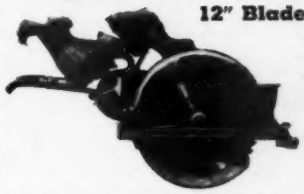
MADE LARGER, LIGHTER
SPLIT-PROOF
STRONGER

Maintenance Men Work ●FASTER ●BETTER ●CHEAPER with Mall Portable Power Tools



Mall Saw MODEL 120

12" Blade—4⅝" Cutting Capacity



Designed for extensive cutting of heavy lumber and timbers used in the construction of concrete forms for piers, retaining walls and larger foundations. It cross cuts or rips timbers up to 4⅝" thick and makes 3" bevel cuts at a 45 degree angle. Also operates abrasive wheel for sawing non-ferrous metal up to ½" in thickness, cutting and scoring stone, tile, concrete and composition materials. Perfectly balanced for safe one-hand use. Equipment includes one 12" cut off blade, one 12" combination rip and cross cut blade, rip fence guide, 10 feet of 3-conductor cord and tube of lubricant.

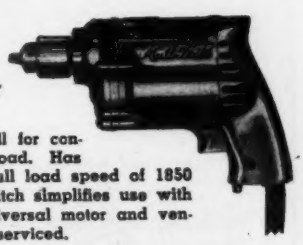
Mall CHAIN SAW

5 H. P.

GASOLINE ENGINE MODEL

A powerful, time and labor-saving tool that squares heavy timbers and logs to size, and fells trees with surprising speed. Operates all day anywhere on right-of-way on very little fuel. Swivel feature permits cutting at necessary angles. Motorized sharpening device for sharpening right on the job. Easily transported on a hand car. Available in 24", 36" and 48" cutting capacities. Also pneumatic models.

NEW Mall ¼" DRILL 143T



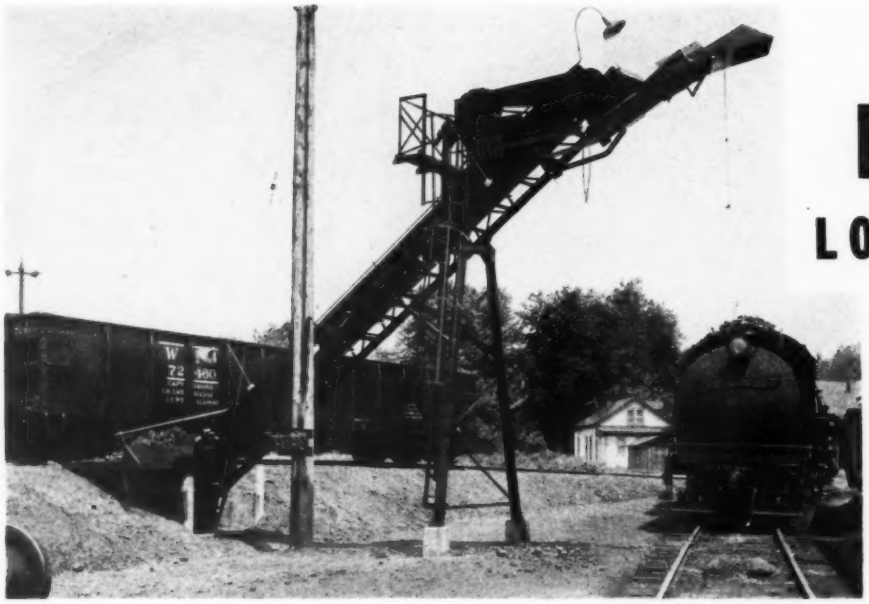
A light-weight, cool running drill for continuous metal drilling under full load. Has free speed of 2850 r.p.m. and full load speed of 1850 r.p.m. Pistol grip and trigger switch simplifies use with either hand. Equipped with universal motor and ventilating fan. Easily and quickly serviced.

Literature and prices upon application.

RAILROAD DEPARTMENT

MALL TOOL COMPANY

7746 SO. CHICAGO AVE. · CHICAGO, ILL.



One of 6 on Baltimore and Ohio Railroad. We have furnished **145** "Red Devils" that are coaling railroad locomotives daily. Capacity up to **150** tons per hour.

"RED DEVIL" LOCOMOTIVE COALER

"Recently installed two of your 'Red Devil' coalers and are extremely gratified with results obtained."

"Ed, we sho' did need this baby, and it is as slick as a greased pig the way it shells out the coal. It reminds me of the way the slot machine kicked them out when you hit the 'jack pot' out at the Chatter Box."

Frisco System.

Manufactured Exclusively By

ROSS AND WHITE COMPANY.

CHICAGO DAILY NEWS BUILDING, CHICAGO

CLYDE P. ROSS, President ● DAVID E. WHITE, Vice Pres. ● GLEN O. MORFORD, Chief Engineer

JORDAN
SPREADER—DITCHER—SNOW PLOW

Does the work of an Army of Men

A comprehensive, versatile, all-year-round unit that will help greatly in keeping your right-of-way in condition to handle peak war traffic

Ditches out cuts
Spreads the fill

Shapes the ballast
Contours the roadbed
Builds up the sub-grade

Plows snow
Cuts ice

Jordan equipment is too valuable to be out of service. Guard against this! Check your maintenance now—and order any needed replacement parts as early as possible.

O. F. JORDAN CO. WALTER J. RILEY, *Pres.* **EAST CHICAGO, IND.**

the SAFETY FEATURES of AMERICAN LOCOMOTIVE CRANES HELP TO ELIMINATE ABSENTEEISM —

A worker laid up with injuries incurred on the job represents as great a production loss as the willful absentee who lays off to go fishing.

If you have an AMERICAN Locomotive Crane you have less absenteeism because of the superior design features illustrated below.

1 { 14-inch clearance between top of carbody and revolving deck. Workmen cannot be crushed if caught between deck and carbody.

2 { The doors slide, instead of being hinged. Cannot be damaged by being caught open in close clearance.

3 { Operator has complete vision without any sacrifice of comfort or convenience.

write for catalog 600-L-1A

SIXTY YEARS OF SAFETY 1883 1943

The Genuine CROSBY CLIP ☆ ☆ ☆

AMERICAN HOIST & DERRICK CO.

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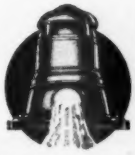

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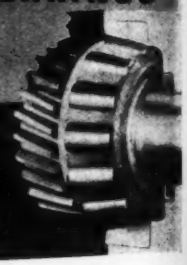

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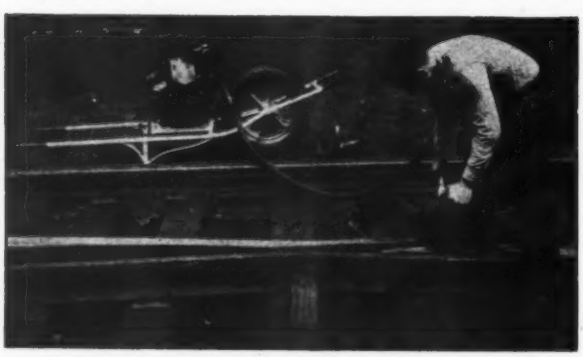

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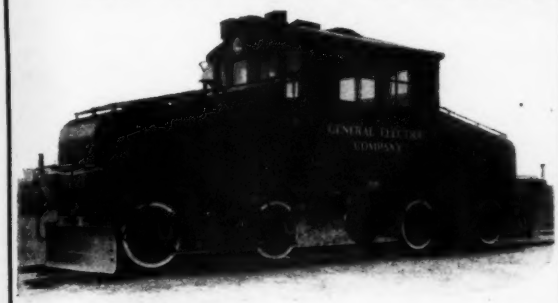

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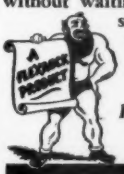

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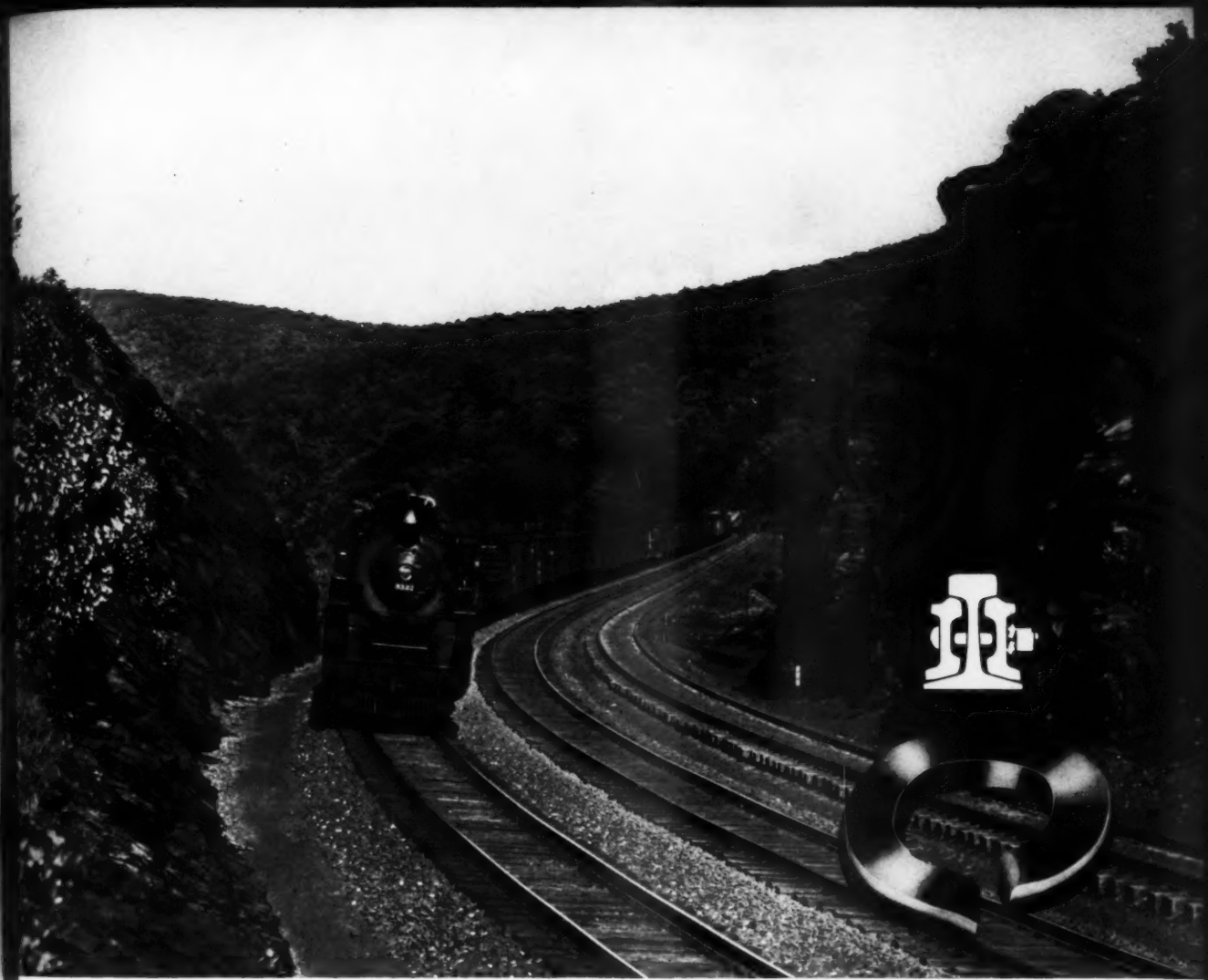

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